UNIV. OF
TORONTO
LIBRARY

BINDING LIST JUN 1 5 1922.

Canadian Forestry Journal

January 1920



FACULTY OF FORESTRY
JUN 7 1929
UNIVERSITY OF TORONTO

Entered at the Post Office, Ottawa, as second-class matter



Field, Stream and Road

How strange the old-time pictures of sport would look today—baseball teams boasting at least half-a-dozen sets of whiskers—full-bearded cricketers—champions of the scull with their chins concealed.

Today the athlete knows the importance of the well-shaven chin. He is conscious that he is most keen when he is well-groomed—just as is the business man and the soldier.

For men who love outdoor life and sports, men of virile minds and active bodies, we have designed a Gillette Safety Razor with an extra stocky handle—the "Bulldog" Gillette, shown to the left.

Not that the Gillette needs a sturdy grasp. A light touch, with the angle stroke, removes the most stubborn beard with surprising comfort.



The "BULLDOG" Set includes oval Morocco Case with two blade boxes to match, and 12 double-edged blades.

But there is a certain appeal in the thicker handle of the "Bulldog". Ask to see this special set and appreciate the point for yourself.

The case, you will notice, is almost as compact as the famous Pocket Edition Gillettes, and the price is the same, $5.00.

Sold by all dealers catering to men's needs.

MADE IN CANADA

TRADE Gillette MARK

KNOWN THE WORLD OVER

Gillette

Safety Razor

573

For. C.

Contents of Canadian Forestry Magazine for 1920

pp. 73-74 missing.

SUBJECT	MONTH	PAGE
A Guide to Ontario Tree Planters	February	77
A new Reference Map for Aerial Purposes (Stuart Graham)	April	186
A Canadian Forester's Training (Dr. Howe)	Aug.-Sept.	408
An Aerial Survey of the Forsets of Northern Ontario. (Craig)	November	519
British Columbia Will Maintain its Forests. (Patullo)	October	474
Canada's Job in Handling Forests. (Dr. Howe)	April	169
Canada's Woods for Aircraft Making (Craig)	May	211
Canada Has Lumbered 100,000 Square Miles (Howe)	May	236
Can Timberlands be Fire Insured? (Hon. W. R. Brown)	July	362
Conditions in Prairie Province Forests. (Wallin)	February	75
Controlling Torrents in France. (MacMillan)	March	121
Developments in Fire-Fighting Equipment. (G. Gerald Blyth)	October	465
Does a Shelter Belt Pay in Dollars? (Bates)	June	313
Do Not Use Less Timber, Grow More. (Greeley)	September	410
Extending Irrigation in Canada West (Muckleston)	November	529
Flying Scouts in Forestry Have Come to Stay. (Stuart Graham)	January	14
Forestry and Irrigation Interdependent. (Robson Black)	January	18
Forestry Legislation in Canada during 1919. (Jacombe)	January	33
Fundamental Commonplaces in Forestry. (Fernow)	January	36
Forest Research in Canada. (Leavitt)	November	519
Great Profits from Forests in the French Jura. (Woolsey)	March	116
Have you a Woodlot Going to Waste. (Morton)	February	58
Has the Hour Arrived for Constructive Forestry? (Wilson)	June	267
How Fast Does a Planted Forest Grow (Wilson)	December	578
Hitching Science to Forest Management. (Wilson)	December	581
How Forest Surveys are Made. (R. D. Craig)	January	3
Hints on Selecting Shade Trees. (Buck)	February	61
Horticultural Work of the C.P.R. (Boyd)	March	112
How Paper is Made. (Stephenson)	April	157
How Long Will Tree Seed Keep its Germinating Power? (B. R. Morton)	April	180
How Fast Will My Shade Trees Grow? (Buck)	May	216
How to Improve a Small Woods. (Morton)	May	227
How to Lay Out a Small Town Park. (Mitchell)	November	511
How Forest Disease Cuts our Wood Crop in Half. (James Kay)	November	549
Is the Forest Safe for Trees (Howe)	June	297
Irrigation and Watershed Forests. (Marnoch)	Aug.-Sept.	425
Improvements in Railway Fire Protection. (Kilby)	December	595
Keeping Coast Forests Productive. (Patullo)	February	67
"Light Burning" Condemned by U.S. Forest Service (Graves)	February	72
Mechanical Attack on Fire. (Grainger)	December	598
New Forests for Nova Scotia's Barrens. (Tupper)	October	469
Our Canadian Maples. (Morton)	July	330
Paper Making in Canada. (Dawe)	October	483
Planning Roads to Include Trees. (W. A. McLean)	January	10
Plain Statements on Canada's Forests. (F. J. D. Barnjum)	January	27
Planting Trees for Permanent Fences. (Zavitz)	June	286

173 11 4 1 22

Planting Clumps for Protection of Stock. (Zavitz) June 290
Pianos in the Making. (G. Gerald Blyth) October 450
Producer and Customer in Biblical Times. (Montgomery) .. March 114
Price Bros.,Ltd., Aerial System July 337
Private Forestry in Canada. (Leavitt) July 354
Practical Training for Foresters. (Dr. Howe) October 471
Prairie Tree Planting and Profits from Livek Stock. (Dr. Rutherford) December 576

Quebec's Way ofProtecting Forests from Fire. (O'Hara) .. December 569

Relative Value of Shade Trees. (Buck) March 118
Restockng the Woods of Rural England. (Parkin) June 289
Reforestation and Pulp Companies. (Lyons) July 341
Reclamation of Pennsylvania's Desert. (Pinchot) July 347
Rebuilding the Scottish Woodlands. (Sutherland) October 463
Rewards for Trained Foresters in Canada. (Dr. Howe) ... November 566

Should the Planting of Shade Trees be Left to the Individual or Controlled by the City (Buck) March 125
Systematic Tree Planting in Country Planning. (W. W. Andrews, LL.D.) February 51
Successful Tree-Growing on Prairie. (Norman Ross) March 102
Some Big Timber of Antiquity. (Kent) June 277
Some Forest Fables No. 1 (Dr. Howe) November 538
Stop the Fires or Lose our Game. (Maxwell Graham) December 559
Some Forest Fables No. 2. (Dr. Howe) December 595

The Policy of Irrigationists. (Col. Dennis) January 21
The Uses and Abuses of Aircraft. (Major Clayton Kennedy) February 28
The Maple Tree as a Profit Maker. (Fisk) March 106
The Forestry Problem in Ontario. (Zavitz) March 122
The Progress of Forestry in Canada. (Leavitt) March 130
The Profits of Tree Planting in France. (Fernow) April 153
The Date Palms of Mesopotamia. (Gill) April 177
The Forward Movement in Forestry. (Leavitt) May 259
The Forester is Both Sower and Reaper. (Fernow) June 284
The Walnut Plantations at Point Platon. (Alain Joly de Lotbiniere) July 325
The Training of a Forester. (Howe) July 334
The Time has Come. (Premier Taschereau) Aug.-Sept. 387
The Empire Joins Hands in Forestry. (Robson Black) Aug.-Sept. 405
The Poplar Trees of Canada. (Morton) December 573
Tree Fences to Block Snow and Sand. (Winegar) April 147
Tree Windbreaks as a Farm Asset. (Bates) June 280
Trees vs. Drought. (Prof. Bryce) July 351
Timber Treatment. (Winegar) July 358
Twenty Years of Forest Tree Planting. (Illick) Aug.-Sept. 397

Use of Aircraft in Forestry and Logging. (Wilson) October 439

What is a "Fir" Tree and Why? (F. W. H. Jacobe) January 5
What it Costs to Clean up a Forest. (Lyons) February 86
Why the Price of Lumber (Robson Black) March 99
Why B. C. Needs a Forest School. (Christie) April 189
What to Plant for Prairie Tree Shelters. (Ross) May 223
Why Close the Timber Industries. (Craig) October 462
What's in Labrador? (Dr. Grenfell) November 499
Where do we Stand in Timber? (Senator Edwards) December 563
Wind and Fire Damage to Forests. (Barnjum) March 127
Wild Life Sanctuaries and the Game Supply. (Miner) May 220
With Mr. Mitchell on our Prairie Car. (Archibald Mitchell) Aug.-Sept. 382

THE YEAR'S STORY OF OUR ASSOCIATION

(Constituting the Directors' Report for 1919)



Membership Has Reached 10,000, and All Forms of Educational Activity Have Met With Success.



On the eve of our twentieth birthday, January 15th, 1920, it is interesting to recall one or two facts surrounding the Association's birth on January 15th, 1900.

The preliminary steps towards the formation of the Canadian Forestry Association were taken by Mr. E. Stewart, then Chief Inspector of Forestry and Timber for the Dominion (now of Toronto), who sent out a circular letter on January 8th, 1900, to a number of men interested in the subject of forestry, asking them to meet at his office on the 15th of that month. At that meeting were present: Sir Henri Joly de Lotbiniere; Mr. Saunders; Mr. William Little; Mr. Thos. Southworth, Director of Forestry for Ontario; Mr. E. Stewart; Prof. John Macoun, Assistant Director of the Geological Survey; Mr. Little was elected Chairman, and Mr. Stewart, Secretary.

On March 7th, 1901, the membership was 244 and the total receipts $192.45.

We have had in 1919 three chief campaigns to improve forest laws and administration, keeping in view always the sane balance that must be maintained between public regulations and the economic status of the wood-using industries.

In some parts of Canada, the absence of any real government machinery to carry out the public responsibility in forest conservation provided opportunities for constructive work along educational lines.

A good deal of time and effort have been expended upon Nova Scotia. The interest of the government in our proposals for the appointment of a Provincial Forester and the commencement of a Forest Service seemed to fluctuate considerably in the past two years, during which we have addressed ourselves to the situation in that province. This necessitated several brief campaigns to revive public pressure. Results, however, have recently been in evidence. The Provincial Government has offered the position of Provincial Forester to a well-qualified Canadian, and it is the Association's belief that this will lead to the reformation of Nova Scotia's fire protection system and the spread of forestry principles and practices amongst the Nova Scotia limit-holders who own the great bulk of the forest areas.

THE DOMINION CAMPAIGN

In the Dominion field the Association's effort to extend technical forestry supervision over the licensed timber berths in the three prairie provinces and the railway belt of British Columbia, as set forth in the last Directors' Report duly passed at the last annual meeting, met with strenuous opposition on the part of the Minister of the Interior, who finally suspended our annual grant from the Dominion Treasury. Every effort has been made towards securing a modification of the Minister's decision. It may be pointed out that the Association's attitude regarding the licensed timber berths on Dominion lands has been one of the cardinal points, not only in our own educational propaganda for many years past, but in the programme of the Commission of Conservation. We have asked only that the Department of the Interior apply forestry supervision to the timber berths within the reserve boundaries, just as it has for years with respect to the unlicensed lands within the reserves. The Association was governed wholly by considerations of public welfare and feels confident that its case will be overwhelmingly supported by the people of Western Canada who are most directly concerned, and whose interests are our primary consideration. It will be the Association's duty to continue to prosecute forestry propaganda in the Prairie Provinces to the utmost of its power.

The campaigns for reforms of forest administration in Ontario, Nova Scotia, and on Dominion lands, can be regarded, as in previous years, as the main task of the Association. The reform of the forest protection system of Ontario, the inauguration of a Forest Service in New Brunswick, the securing of fire legislation in the

prairie provinces, and other enterprises involving open agitation have well illustrated the potency of our educational propaganda, when focused upon special objects.

FOREST PROTECTION PROPAGANDA.

Educational work aimed at enlisting public co-operation in forest fire prevention was carried forward to the limit of the Association's purse. The Secretary gave a total of 40 lectures, with motion pictures, encountering large audiences whether in New Brunswick or the western provinces. A western series of meetings in October gained public support quite unprecedented in the Secretary's experience, large business organizations taking the meetings in charge and assuring excellent attendance. Newspaper co-operation in the Association's objects is everywhere unstinted and has proved of high value. In the western field particularly, Universities, Canadian Clubs, Rotary Clubs, and Normal schools provided the Association with many more invitations for addresses than could be filled. The attitude of prairie province business men towards conservation of their provincial forests and the development of tree planting in the southern areas has materially changed during the war period and constitutes a rich field for educational cultivation.

Mr. A. H. Beaubien was again engaged by the Association for French lectures in Quebec and covered 20 communities with almost unvaried success. Quantities of French literature and good motion pictures accompanied him.

By courtesy of the Dominion Forestry Branch, Mr. James R. Dickson was secured by us for a tour of Northern Ontario in charge of our Exhibition Car. Mr. Dickson spent three weeks in our service, together with a motion picture operator, visiting about twenty towns in regions where forest protection required stimulating. He was able to deliver nightly lectures with motion picture illustrations and was given a happy reception throughout.

Again, through the Dominion Forestry Branch we secured Mr. R. M. Watt, of Dauphin, Man., to take our Exhibition Car through the prairie provinces. Mr. Watt did sterling work and was indefatigable in his efforts to secure large attendances and interest the people. Thus at various periods of the year four lecturers have been working in the Association's campaigns. In New Brunswick, we were allowed the valued service of Mr. Kinghorn during the visits of our Car to the Fredericton and Chatham exhibitions.

THE RAILWAY EXHIBITION CAR.

Special attention is directed towards the Association's Railway Car which, as has been said, is a "forest protection school on wheels." With no alternative other than to secure exhibits by borrowing, some very attractive objects were brought together from many parts of the continent, including a complete display of all things made from pulp and paper for war purposes; a maple bush model; a model forest nursery; displays of wood distillates and wood samples; a ship model; entomological exhibits and wireless telegraph and telephones in operation, and a score of other objects, the whole assembled within the cleared space of a railway car with ornamentations of transparencies and flags. The car has been handed over to us temporarily by the Canadian National Railways, to which our hearty thanks are due. The car will start out again with improved equipment in May this year and, if our funds will allow, there would be an excellent opportunity in the western provinces for a second car arranged to emphasize especially tree planting in the southern prairies. The route taken by the car in 1919 included scores of small towns from Chatham, New Brunswick, to Calgary, Alberta.

Our custom of printing and distributing educational booklets for children and a variety of special issues aimed at such classes as settlers, was again followed with what seemed to be satisfactory results.

A number of large painted banners with fire prevention inscriptions were placed along railway lines. The Imperial Tobacco Company co-operated wtih us effectively by placing in cigarette packages warnings against carelessness with fire in the forest. Ten thousand menu cards in the dining cars of the main railway lines had our sermonettes on forest protection attached. We also had a fine response from lumber companies who were supplied by us with advertising copy as a substitute for their regular advertising in the newspapers. These are but representative of other publicity devices put into effect by the Association in 1919.

Articles for the newspapers and magazines have been supplied at frequent intervals and have been made use of freely. Our Travelling Lecture Sets, with slides and manuscript, proved once more an attractive educational medium.

IMPERIAL FORESTRY CONFERENCE.

Although somewhat outside the regular programme of our work, it may be pertinent to mention the move made by the Secretary of the Association to inaugurate an Imperial Forestry Conference having as its object a round-table discussion of the forestry problems and policies

of the various sections of the British Empire. This was designed to aid all foresters in public administrative positions and to inaugurate some method of permanent inter-communication between them. It was thought also that a logical development of such conferences would be the stimulation of inter-Imperial trade in forest products. Thus, it was suggested, there might come about a clearing-house of information on trade opportunities in timber and its manufactures that would prove of great advantage to Canada. The scheme was eagerly taken up by Scottish and English forestry authorities and gained the endorsation of the British Government's new Forestry Commission. Recently the Chairman of the Commission was authorized to call an Empire Forestry Conference for July, 1920, to take place at the same time as the Empire Timber Exhibit in London.

MEMBERSHIP.

The development of membership in the Canadian Forestry Association requires constant promotion work through every day of the year. There is practically no unsolicited accretion of strength and this is in keeping with the experience of nearly all other associations. The securing of members requires a very large volume of correspondence, quantities of special literature, and the use of local solicitors. The results for 1919 amounted to 3,000 new members, representing 37½ per cent increase in the one year, and 333 per cent increase since the commencement of the war period. We have now a healthy membership strength of 10,000 scattered over the entire Dominion. We have also members in India, Ceylon, Russia, Sweden, Denmark, South Africa, Australia, New Zealand, France, Spain, 250 in the United States, and a substantial body in the British Isles.

THE NEW MEMBERSHIP FEE.

In the correspondence of new members, abundant evidence is given that the responsibility of the state in administrating the forest resources has taken a strong hold upon popular thought. The Association has gained new adherents mainly by emphasizing the economic soundness of its policies, its detachment from all government and commercial bodies and the consistency of its objects with public welfare. We look forward to an even larger addition to the membership in 1920. It was decided by an almost unanimous vote of the Directors to establish an annual charge of one dollar for subscription to the Journal, in addition to the dollar membership fee. This is necessary in order to secure from the body of members not only the cost of printing the Forestry Journal, but a supplementary revenue for the general educational work of the Association.

The Canadian Forestry Journal, our official monthly, has proved a great factor in holding old members and gaining new ones. It has rendered an educational service to which many of our members bear a hearty tribute. Month by month, through text and illustration, the Journal spreads into all parts of Canada the Association's creed in forest protection and administration. We have made a special point of building up public interest in the economic magnitude of the wood-using industries of Canada and the need for the fullest public co-operation in maintaining their raw materials of standing timber.

The Forestry Journal hitherto has been prevented from developing its advertising patronage through lack of circulation. Having successfully passed the 10,000 mark, the Journal takes on new rank as an advertising medium, according to Canadian advertising experts consulted. We expect thereby to cut down the cost of the Journal's publication in 1920. The Secretary managed in December last to reduce the printing cost for 1920 by $800 over 1919, and by $1,300 over the best other tender we could obtain.

As to the collection of special subscriptions, the record for 1919 suggests how steadily the Association's educational work is gaining in favor of observant individuals and companies.

SPECIAL SUBSCRIPTIONS IN 1919.

Laurentide Co.	$400
Laurentian Forest Protective Association	100
Southern St. Lawrence Protective Association	100
H. N. Haberer	100
A. H. Campbell	50
Wayagamack Co.	25
W. C. Edwards & Co.	100
River Ouelle Pulp and Paper Co.	100
Riordon Pulp and Paper Co.	300
W. H. Johnson	100
Spanish River Pulp and Paper Mills	200
Abitibi Pulp and Paper Co.	200
J. R. Booth	200
H. H. Hettler	50
J. K. McDonald	25
Brown Corporation	200
N. B. Railway Co.	100
Colonial Lumber Co.	50
James McLaren Co.	200
Baie St. Paul Lumber Co.	50
Shevlin-Clarke Co.	200
H. A. Calvin	50
Bathurst Lumber Co.	200
Pembroke Lumber Co.	50

Ontario Paper Co.	200
C. Beck Manufacturing Co.	50
Bronson Co.	100
Graves, Bigwood & Co.	50
Port Arthur Pulp and Paper Co.	50
N. S. Steel and Coal Co.	100
Belgo-Canadian Pulp and Paper Co.	200
St. Maurice Forest Protective Association	100
North American Bent Chair Co.	25
Price Bros.	200
Northern Timber Co.	25
Beardmore & Co.	25
Randolph and Baker	10
Merchants Bank	100
Keewatin Lumber Co.	25
J. Kaufman	25
Canada Paper Co.	150
Fraser & Co.	75
Gillies Bros.	100
St. Maurice Paper Co.	100
International Nickel Co.	25
W. J. Bell	100
Stetson, Cutler & Co.	50
New Ontario Colonization Co.	25
Canada Western Lumber Co.	50
Fraser's, Limited	50
McLachlin Bros.	100
Brompton Pulp and Paper Co.	100
Nashwaak Pulp and Paper Co.	50
James Richardson Co.	50
Hon. N. Curry	100
M. J. O'Brien	100
Shives Lumber Co.	25
J. B. Snowball Co.	50
Mirimachi Lumber Co.	50
Estate of Wm. Hendrie	100
Haight & Dickson Lumber Co.	5
Howard Smith Paper Mills	100
Genoa Bay Lumber Co.	50
New Ontario Contracting Co.	50
Harold Kennedy	100
Standard Chemical Co.	100
F. D. J. Barnjum	100
Hope Lumber Co.	50
Excelsior Lumber Co.	25
Cushing Bros.	25
Nova Scotia Steel & Coal Co.	100
Imperial Bank	50
Royal Securities Corporation	200

73 contributors totalling	$6,840
Quebec firms contributed	$3,800
Ontario firms contributed	1,905
New Brunswick firms contributed	585
Nova Scotia firms contributed	400
British Columbia firms contributed	100
Alberta firms contributed	50

A further tabulation of special subscriptions gives this result:

Pulp and paper firms	$3,625
Lumber firms	2,415
Other donors	800

It is but fitting to convey our hearty thanks to the members of the Financial Committee who co-operated so splendidly with the Secretary. The commitee was composed of: W. E. Bigwood, W. G. Clarke, A. T. Cushing, Hon. A. C. Flummerfelt, W. E. Golding, I. H. Weldon, H. R. MacMillan, W. Gerard Power and Carl Riordon.

How widely based is the financial support of the Association appears from the 1919 list of donors. Our grants from special sources, independent of governments, have advanced as follows:

1916—the first year in which the Secretary sought special donations	$1,010.10
1917	2,235.00
1918	3,750.00
1919	6,840.00

OUR FINANCIAL GROWTH.

There is offered here an interesting comparison of our total revenues from all sources since the outbreak of the war:

1915	$5,279.23
1916	7,182.60
1917	11,192.16
1918	14,296.10
1919	20,067.70

Despite the entirely unexpected action of the Minister of the Interior in cutting off $1,000 of the 1919 grant in October, sufficient new money was quickly raised to give us a surplus at the end of the calendar year of $1,024.33.

It is obvious, however, that the Association is forced to travel on too slender financial resources. In the absence of any endowment or large government grants there is always the necessity of struggling to keep ahead of expenses. The mapping out of new fields of effort cannot be proceeded with in any satisfactory way unless means are devised of establishing the Association's income so that a programme may be drawn up for the entire year and not be subject to fluctuations in order to accord with the income probabilities.

The Directors wish to submit to the Annual Meeting the question whether the employment of an Assistant Secretary is advisable.

The Association may well consider also the establishment of a Resident Western Secretary as soon as the funds permit. The growth of the Association in the three prairie provinces has been unprecedented during 1919 and in such a city as Winnipeg, hitherto considered not the most promising field for membership develop-

ment in a forestry society, the number of members has increased from 300 to over 1,500 within the last six months. In discussing the project with many bodies of western business men in October last, it was impressed upon the Secretary that the appointment of a western propagandist, giving attention to the prairie provinces and British Columbia, would give new vitality to our enterprises beyond the Great Lakes.

Another project from which we are temporarily debarred by lack of financial support is the establishment of a Children's Lecturer, devoting his time entirely to propagandist work with Boy Scouts, school children, etc. The contact already established between our work and the growing generation demonstrates the remarkable attractiveness of the forest conservation idea to the child mind and the great possibilities of inculcating during the early stages sound ideals for the public administration of the natural resources.

ROBSON BLACK, *Secretary.*

DR. FERNOW ON THE TASK AHEAD

(A letter written by the Dean Emeritus of the Faculty of Forestry, Toronto, to the annual meeting of the Canadian Forestry Association at Quebec.)

Being by my physical condition prevented from attending your meeting, I accept gladly the invitation to express in writing some thoughts fit for the occasion.

In the first place, I want to congratulate you on the excellent progress which the Association has made under your guidance in spite of war conditions. Having myself been identified with the forestry movement on this continent for some forty years, nearly half that time as Secretary and as Chairman of the Executive Committee of the American Forestry Association, I know and appreciate fully the difficulties of introducing an economic reform in which the human element is lacking or at least indirect.

In this endeavor there are three phases of development to be recognized, namely: the formation of public opinion; the influencing of government activity; the providing of technical knowledge and ability. The growth of the Association testifies to the success of having secured large and influential public opinion on the necessity of forestry reform. A partial success has been attained in persuading the authorities that the abandonment of methods fit for the pioneering stages of national existence is necessary and are awaiting advice how to secure such reform. But the third phase of the development, the procuring of the means for providing such advice is largely deferred.

We have begun in earnest to eradicate the greatest enemy of our forests—the fire; at least we know how to combat it if the necessary funds are furnished. Forestry, however, is not accomplished by such protection against destruction. Forestry means reproduction, regeneration, reforestation—silviculture. Of this science we know but little that is applicable under our special conditions. Silviculture is based upon empiricism, experiment and experience in the woods, and, to secure such, time is required —a long time. In the forestry schools we can impart the fundamental basis for silvicultural practice and turn out men who may become foresters if opportunity is given them to experiment and gather experience in the woods.

Such experimentation—or research—to use a term now become popular—has been begun in a small way by the Commission of Conservation, the federal Forestry Branch, and a few private concerns. It should be taken up on a large scale by the Departments of Lands of the provinces and by the Dominion Branch, so that they may learn what conditions to prescribe for the logging of their limits with a view of securing reproduction.

This in my opinion, is now a most urgent matter and should form a part of the programme of the Association, the securing of adequate endowments and opportunities for educating foresters and gaining silvicultural experience.

Sincerely yours,

B. E. FERNOW.

SOUTHERN STATES DEMAND NEW FOREST METHODS

Canadians will be interested in this expression of the Southern Forestry Congress at New Orleans last month. The lumber industry of the Eastern States is now focused in the south, where the main body of eastern timber stands. The depletion of this timber by current methods of logging brought from the Congress of business men and foresters the following resolution:

FOREST DENUDATION.

Whereas, the supplies of softwood and hardwood timber in the Southern States are rapidly diminishing, with a consequent influence upon the price of lumber and other forest products.

Be it resolved, by the Southern Forestry Congress that it deplores the continuance of such practice of denudation and urges, in order that such practice may be avoided, the enactment of legislation by the Southern States that will require or make possible the adoption of measures by owners that will prevent such denudation and wil lafford an opportunity for a natural replacement of forest growth on lands not suited or not needed for agriculture or settlement; and, furthermore, the Southern Forestry Congress urges the States and the Federal Government jointly to co-operate liberally with owners in this direction.

SEED TREES.

Whereas, the south is approaching the end of its virgin timber supplies, and

Whereas, great necessity exists for retaining on cut-over lands enough seed-bearing trees to restock these lands; therefore

Be it resolved, that the Southern Forestry Congress urges all owners of forest lands in the south to pay particular attention to this matter which is of such vital concern to the south's welfare.

BOY SCOUTS TO GRADUATE AS "FOREST RANGERS"

Canadian Boy Scouts will be interested in a newly-launched organization in Chicago called the "Forest Rangers," which is intended to begin where the Boy Scouts leave off, and afford older boys a sort of post graduate course in woodcraft and the elements of forestry, at the same time instilling the wholesome principles of life for which the Boy Scout movement has always stood. The new organization is sponsored by Chief Forester Rance Kennicott, of the Cook County (Illinois) forest preserve. As in other juvenile organizations, there has been a tendency on the part of the older scouts to drop out at about the age of eighteen, or even younger, notwithstanding special tasks with corresponding honors, medals, etc., designed to interest and hold the older boys. The advent of the "long pants" age has to a large degree been the signal for getting out—simply gecause the 18-year old boy quite naturally regards himself as almost, if not quite, a man; and does not care to retain membership, unless as a scoutmaster or aid, in an organization that carries the word "boy" in its title, particularly as the bulk of its membership is made up of lads of from 12 to 16 years of age.

This objection seems to be effectively answered by the new organization, which its promoters believe will spread over the entire country and to foreign lands, just as tse Boy Scout movement which it is designed to supplement—not supplant—has done. Already the natty green caps which form part of the winter uniform of the rangers are, upon Saturdays and holidays, seen quite numerously in the Cook county forest preserve, where the boys, as Chief Forester Kennicott says, "are learning how to take care of themselves in the woods, and how to take care of the woods they are in." The age limits for admission to membership in the rangers are 15 to 21 years, and candidates are expected to "enlist" for a term of three years. The courses of study, and practice, will include woodcraft and elemental forestry, instruction in preventing and in fighting forest fires, camping, radio operation, etc.

WORKING PLANS FOR QUEBEC'S TREE CUTTING

Hon. Honore Mercier, Minister of Lands and Forests, in addressing the Canadian Lumbermen's Association at its annual banquet at Quebec, referred to fire protection and reforestation, dealing with constructive policies that should prove of undougted benefit. While he dealt primarily with conditions in Quebec, his words have a national application.

"Quebec has before it a vast colonization programme," said Hon. Mr. Mercier. "With a determination to understand each other's needs there is no reason why the lumbermen and the settlers should not get on perfectly well together. The lumbermen of St. Maurice have much for which to thank the settlers of Abitibi. With mutual forbearance and consideration, I feel there will not be much difficulty in deciding where the forests are to remain and where the land may be taken by settlers. A law was passed requiring settlers to take permits before burning to clear their lands. They have complied with this enactment and we have now a system of fire protection which is the envy of all the other provinces. The province has now to look to the development of its unsettled lands.

WILL MAKE COMPLETE SURVEY.

"Lumber has always meant much to Quebec, and the forests still remain one of the chief assets of the province. Our resources are great. We have 45,000,000 acres of timber lands under license, and approximately 75,000,000 of virgin timber lands. We do not, however, know the value of these forests, and we should like to make a complete survey of all forest land in order to build up a definite forest policy. For this we shall require the assistance of limitholders so far as the survey of their limits is concerned; and the task of the Government in surveying the remaining territory will still be a vast one. In a word, the time has come for us to require the preparation of working plans in lumbering operations. You will admit that it is in the public interests as well as your own to plan your operations ahead, so as to leave the forest after cutting it in the best possible condition for future growth. The objection which may once have existed to such a policy has disappeared. With our well-organized fire protective system, due largely to your co-operation, the danger of fire has been greatly reduced and therefore you can afford not to cut the forest too close, in order that you can cut over again in a reasonable time.

ADVOCATES REFORESTATION.

"For the same reason private owners of waste lands may safely commence their reforestation. The Government intends to deal with lumber limits in a generous manner, but expects the limit-holders to do their share, too. The lumber industry in the past has done wonderful things to encourage the efficiency of mill operations and to reduce waste in the utilization of wood products. There is still much more to be done in this respect, notably in the use of hardwoods which have been practically untouched by present operations. I think we may rely upon lumbermen to devise proper and adequate methods of transportating these logs from the forest to the mill."

SCIENTIFIC INVESTIGATION SUPPORTED

"Whereas, it is manifestly to the interest of Canada as a whole, and of the wood-using industries in particular, that the fullest possible information be made available as to the character and extent of the forest resources of the Dominion, and as to the conditions which govern the reproduction and growth of the commercially valuable tree species;

"Resolved, tha t this meeting endorse the work along these lines already under way by the Commission of Conservation, with particular reference to the survey of the forest resources of the several provinces, in co-operation with the provincial governments, and the investigation of conditions of growth and reproduction of pulpwood species, in co-operation with pulp and paper companies, and the Dominion Forestry Branch and the Provincial Forestry Services, and recommend to the Dominion Government that financial provision be made for the continuation of these projects upon a more adequate scale."

(A resolution adopted at the meeting of the Woodlands Section, Canadian Pulp and Paper Association, Montreal.)

WAR ON FOREST INSECTS.

The Resolutions Committee further recommended:

First—That the Woodlands Section of the Canadian Pulp and Paper Association wish to place on record their deep appreciation of the commercial utility of the work of the Dominion Entomological Branch of the Department of Agriculture, particularly the Forest Insects section, under Dr. Swaine, which directly concerns our industry and recommend sufficient funds be provided in the estimates and placed at the disposal of this department to at least double the number of field parties in 1920.

Second—That in view of the large number of fires caused by coal-burning locomotives passing through our forest areas and the great losses resulting therefrom, that this meeting recommend that such railways be electrified where the water-falls in the forest areas are ample to supply the necessary power."

"LIGHT BURNING" CONDEMNED BY U. S. FOREST SERVICE.

By H. S. Graves, Chief Forester of the United States.

Light burning advocates assert that by firing pine forests every few years the woods will be kept clean and inflammable debris without injury to the merchantable stumpage, even without substantial injury to the young growth. The constant cleaning out of small stuff, underbrush and litter supposedly would thus protect the woods from serious conflagrations. It has even been claimed that pine forests protected by this system will no burn, and he whole thing is to be done at a cost of a fraction of a cent an acre.

BRUSH PATCHES ARE RESULT.

As a matter of fact it is precisely the repeated firing of the woods which has steadily eaten up the pine forests of California. Our national forests of that state contain close to two million acres of brush patches, which once were heavily timbered. Wiping out the forests on these areas in the national forests alone has cost the timber resources of California on the basis of average figures, around 37 billion feet of stumpage, and probably $75,000,000 in value at the present time. This loss is not the result of a few large conflagrations. Largely it has come about from one ground fire after another, extending over a total period of 50 or 100 years. Not only does each of these ground fires destroy much or all of the young growth; the butts of the old timber are eaten out, inch by inch. After every burning a few more of the old trees tople over in the wind. The ultimate result is a brush patch.

To me it is an absurd proposition that we can now go into the pine forests and fire large areas deliberately at a negligible cost per acre, which is one of the main claims of the advocates of the system, without continuing the same process of gradual but irresistible destruction. The light burning is supposed to be "controlled." In practice this control apparently amounts only to choosing the time of year when the woods are fired. The Forest Service has studied every area which it was able to learn about where intentional light burning has been practiced. Its effects have been substantially the same as those of the unintentional ground fire in the California pine forests. In every case at least a large part of the young growth is killed. In every case more or less injury has been done to old timber, except, where large trees have been protected by costly methods, such as raking debris from the butts or piling earth around them, methods so costly that the light burners have now abandoned them.

NO YOUNG GROWTH TO SPARE.

The Forest Service has no young growth to burn up. Neither has it any merchantable stumpage to sacrifice to a theory of protection which is essentially destructive. Hundreds of thousands of acres of national forest land in the western pine belt, which have been protected successfully for 12 or 15 years, now furnish a practical demonstration of what these forests can be made to produce under a genuine system of fire protection. Their brush patches are disappearing in thickets of pine saplings. The net growth per acre has been tremendously increased. The timber which the whole country will need when our virgin forests are depleted is now being produced. The Forest Service must oppose with the utmost vigor any system of protection which will wreck these growing forests or which will make it impossible to produce similar forests in the western pine belt generally.

Canadian Forestry Journal

VOL. XVI. OTTAWA, CANADA, JANUARY, 1920. No. 1.



Foresters running a survey through open country.

HOW FOREST SURVEYS ARE MADE

By Roland D. Craig, Commission of Conservation;
Co-author of "The Forest Resources of British Columbia."

With the rise in stumpage values, greater accuracy in timber estimating has become necessary. In the days of plenty, the "timber looker" had only to wander through a tract until he saw enough timber to justify a purchase or an operation, but to-day, with standing white pine selling at $20.00 per thousand feet, and other species, formerly regarded as of little or no value, commanding proportional prices in the lumber industry, the making of a forest survey has become a technical undertaking requiring a knowledge of surveying and forest mensuration. A forest survey should include not only an estimate of the amount of timber but the preparation of a map from which logging operations can be intelligently planned.

Except where great accuracy is desired and tract to be covered is small it is unnecessary, if not impossible, to measure all the trees so that estimates of the total stand are almost always based on average yields found on sample areas. The sample areas may be taken in small blocks at regular intervals throughout the tract, but the better way is to lay them out in strips running across the tract.

The percentage of the area to be actually cruised depends on the degree of accuracy desired, the area of the tract and the nature of the country. On large areas, of say a township in extent, where topographical and forest conditions are more or less uniform, an actual cruise of five per cent of the area or in some

cases even less, will give a reasonably accurate basis for an estimate of the whole. On smaller areas, or where the conditions which show much variation, it is necessary to cruise at least ten per cent of the area.

THE FIRST STEP IN A SURVEY.

In conducting a forest survey the first thing to do is to establish an accurately measured base-line. If a convenient surveyed line does not exist it is necessary to run one out, leaving marks at every five or ten chains to which the cruised strips can be tied.

The survey should be laid out so that the strips run at right angles to the ridges and streams, otherwise misleading tallies, which do not represent average conditions, will be secured. The width of the strips will depend on the nature of the forest. In open woods the cruiser may be able to see for a chain on each side of the line, but in dense spruce woods he may be able to see only a rod on each side.

The cruising party may consist of two to four men. In large timber two men may suffice, but in small, dense timber it is better to have three or four. The party is guided by a compass-man who, in addition to maintaining the direction with a hand-compass, keeps track of the distance travelled and usually takes notes on the topographical features. The distance is sometimes measured by pacing but usually by means of a tape-chain attached to the compass-man's belt, the end of each chain being marked by a scratch on the ground, blaze or broken twig. In two men parties the cruiser watches the rear end of the chain and tallies the diameter at breast-height and the height class of each tree in the strip. The height class can be recorded in different ways but it can, perhaps, be most readily expressed by the number of logs of a certain length that the tree will cut. When more than two men are used, the additional men call out the sizes of the trees within the strip to the rear chain man who acts as tally-man. The diameters, in some cases, are measured by calipers, but usually the cruiser's eye soon gets trained to estimate the size with sufficient accuracy.

Tally sheets should be changed with each change in the forest type so that when all the cruising lines are completed the boundaries of the various types such as heavy timber, light timber, muskegs, burns, etc., can be mapped in and the areas of each determined.

The total volume can be obtained with greater accuracy by working up the volume on each type separately than by lumping all the samples together and applying the average to the total area. The greatest source of error in timber estimating has always been in the area to which the detailed estimates are applied. Most of the old "experienced" cruisers can tell with remarkable accuracy the amount of timber which can be cut on a given area, but the variability of the stand in almost every forest area necessitates as much care in estimating the areas of the various types as in estimating the amount of timber on the areas cruised.

TELLING A TREE'S CONTENTS.

Long experience in checking estimates by cutting has enabled many cruisers to tell the contents of a tree with great accuracy especially in types with which they are familiar. The judgment of estimators is not always reliable and it has been found much safer to base the estimates of the stand on actual tree tallies and volume tables which give the average contents of trees of various diameters and heights. These volume tables are based on the actual measurements of a large number of trees. Unfortunately, very little has yet been done officially in Canada in preparing volume tables, but the United States Forest Service has published tables for the species of trees found here and with some adaptation to local conditions these can be used in Canada. Most Canadian foresters engaged in this kind of work have, however developed volume tables of their own.

The ordinary strip survey supplies data for a good working map and, if elevations are taken frequently with an aneroid barometer and checked up faithfully with known elevations on the base-line, a contour map can be made which will be of great value in laying out logging operations.

It must be remembered that the accuracy of the survey depends on the proportion of the area actually cruised and, though a five per cent cruise may give a reasonably accurate idea of the total stand on a large area, it is almost sure to be found deficient in detail when applied to a small area as a basis of a small logging operation.



Making a close survey with calipers, on Riding Mountain Forest Reserve, Manitoba.

WHAT IS A "FIR" TREE, AND WHY?

By F. W. H. Jacombe, M.F., Ottawa.

The use of the word "fir" in Great Britain differs widely from its use in North America. The practice of foresters in Canada and the United States is to confine the term to the genus *Abies* (commonly known as "balsam" or "balsam fir," represented in Europe by the "silver fir," *Abies pectinata*) and the Douglas fir (*Pseudotsuga*). In Europe, on the other hand, the word "fir" is used in a general and indefinite way which to a non-European is somewhat bewildering. One reads of "fir," "silver fir," "spruce fir," "Douglas fir," and even of "hemlock spruce fir."

Probably the origin of the confusion is to be found in the fact that the word "fir" (of Scandinavian origin and cognate with the Latin word "*quercus*") was originally applied to the Scotch Pine (*Pinus silvestris*), the only indigenous conifer of the British Isles. Some four centuries ago, the Norway Spruce was introduced from the continent, and was known as "spruce fir." The word "spruce" originally was "pruce," and the meaning "Prussian;" consequently the expression "spruce fir" means nothing else than "Prussian fir." Somehow the initial "s" became attached to the word, some claim from the fact that from the shoots (sprossen) of the tree "sprossen bier" was made. Hence the Norway spruce (*Picea excelsa*) came to be known as "spruce fir," an expression finally shortened to "spruce." (The origin of the expression "spruce up" is similar, possibly from a notion that certain representatives of the race were superior to most other people in point of nattiness of attire, and, no doubt, conceit). From the same sense of "fir" as meaning, generally, a coniferous tree come the expressions "silver fir," "Douglas fir," etc.

J. C. Loudon, writing in his *Arboretum et Fruticetum Britannicum* in the late thirties of the nineteenth century, calls the members of the genus *Abies* (which, however, he denominates Picea) "silver firs," speaks of the spruces as "spruce firs," and also uses the terms "hemlock spruce fir" (our hemlock) and "Douglas's spruce fir" (our Douglas fir). Our Balsam fir he speaks of as the "Balsam of Gilead, or American, silver fir." Veitch's Manual of the Coniferae (London, 1900) uses respectively the terms "silver fir," "spruce fir," "hemlock fir," and "Douglas fir."

The Encyclopedia Britannica (eleventh edition) describes "hemlock spruce" and "Douglas spruce," and speaks of the word "fir" as "at present not infrequently employed as a general term for the whole of the true conifers (*Abietineae*)" (this term in-

cludes the spruces, firs (*Abies*), pines and larches) "in a more exact sense it has been transferred to the spruces and silver firs, the genera *Picea* and *Abies* of most modern botanists."

Elwes and Henry, in their monumental work *The Trees of Great Britain and Ireland* (published 1906-1912), largely follow the practice of restricting the term "fir" to the genus *Abies*, but apply the name "common silver fir" to the species commonly grown in Europe (*Abies pectinata*) and the name "balsam fir" to the tree commonly known by this name (or simply "balsam") on this continent. They speak also of the "spruce firs," but use the term "hemlock" instead of the "hemlock spruce" of other writers, though they speak of the common Eastern American species (*Tsuga canadensis*) as the "hemlock or hemlock spruce." "Douglas fir" is the name they adopt for the famed western species (*Pseudotsuga mucronata* or *Douglasii*).

From the standpoint of simplicity the American terminology has a great advantage; but it is hard to change long-established usage, and the British usage is still indefinite though doubtless time will effect the change in nomenclature.



It looks "barbered" but it isn't. The white cedar tree in the picture is a natural growth out of a stump, four and a half miles east of St. Thomas, Ontario



How trees are sent out to the prairie farmer from the Tree Nursery Station of the Dominion Forestry Branch at Indian Head, Sask.

THE FOREST AS FINLAND'S MONEY CHEST

Finland covers an area of approximately 150,000 square miles. It is a country of lakes and swamps with tracts of higher land, occupied by farms or covered by forests in between. The climate is severe. Yet the snowfall is not sufficient to interfere with winter logging. The upland soil is poor and stony. Until quite recently, even long after extensive state Forests had been set aside, it was the belief of a majority of the people (and the government) that the forests should be cleared away and that the land should be farmed. In spite of all of the encouragement that could be given the farmed and grazed lands have not, in many decades, produced anywhere nearly sufficient food to satisfy the nation's needs. It has only been within the last 25 or 30 years that the real value of the forests to the nation has been realized.

The Finnish Forestry Department was created in 1863. To it was entrusted the care and management of the 32,078,457 acres of state-owned forested lands. Of this large area (approximately one-third of Finland's total area) only 13,723,723 acres (43 per cent) is classed as good quality forest land. The rest is either swamp, poor sand or rock, and is either barren or covered by a poor stand of tree growth. The first duty of the Finnish Forestry Department was to protect, especially from fire and trespass, these state forest lands. In doing so the Forest Department officials had to face the vigorous hostility of the people for the latter had long considered the cutting and burning of the state forests as within their personal rights.. During the earlier part of its existence, the Forestry Department was also hampered by small appropriations ($107,000 for the year 1870), the first income for that year being $51,000. The annual appropriation was increased gradually until in 1900 it amounted to $239,000 and in the meantime the annual forest income had reached $1,-024,000. In addition to the state and privately owned forests there is a considerable area of municipally owned forests.

Pine, spruce and birch are the principal Finnish forest trees. In 1910, which may be taken as a normal year, after for a long time having vigorously encouraged the transfer of land from forest to agricultural use, Finland imported about $20,000,000 worth of agricultural products while it exported about $50,000,000 worth (80 per cent of all exports) of forest products. These figures show the value to Finland of her forests in international trade.



Western Ontario's patches of lovely woodland—a group of pin oaks.

The Heart of The Tree.

Written by Ethel Hutchings, B.A., 25 years ago, while her father, E. F. Hutchings, was planting the trees in front of his home in Winnipeg, Manitoba. The trees are now full grown.

What does he who plants a tree,
He plants the friend of sun and sky,
He plants the flag of breezes free;
The shaft of beauty towers high;
He plants a home to heaven anigh,
For song of mother-croon of bird,
In hushed and happy twilight heard
The treble of heaven's harmony,
These things he plants who plants a tree.

What does he plant who plants a tree,
He plants cool shade and tender rain,
And seed and bud of days to be
And years that fade and flush again;
He plants the glory of the plain,
He plants the forest's heritage,
The harvest of a coming age,
The joy that unborn eyes shall see,
Those things he plants who plants a tree.

What does he plant who plants a tree,
He plants in sap, and leaf, and wood,
In love of home and loyalty,
And far-cast thought of civic good
His blessing on the neighborhood,
When in the hollow of his hand
Holds all the growth of all our land,
A nation's growth from sea to sea
Stirs in his heart who plants a tree.

ONTARIO'S NEW ROADS TO HAVE TREE BORDERS

Under the guidance of Mr. W. A. McLean, Deputy Minister of Ontario's Department of Public Highways, a new and most interesting tree planting policy has been brought to public notice. Mr. McLean advocates the widening of provincial highways in order to accommodate not only the modern features of motor traffic and electric railways, but to provide space for the planting of rows of the best trees.

In a letter to the Editor of the Forestry Journal, Mr. McLean says:

DEAR SIR:

I am in receipt of your letter of December 20th with respect to the planting of shade trees along new roads in Ontario.

I am herewith enclosing a pamphlet with respect to the widening of roads assumed as Provincial Highways, which is self-explanatory and which indicates our desire to obtain greater width in order that trees may be permanently maintained along these important thoroughfares. This applies more especially to the main artery from the vicinity of Windsor to the Quebec boundary and with branches from Prescott to Ottawa and Hamilton to Niagara Falls.

Roads as originally laid out in the earlier surveys of the province necessarily took consideration only horse-drawn traffic and no provision was made for the additional requirements of motor traffic, as well as street railways, electric power, telephone and telegraph services which many main highways are now required to accommodate.

As a result ,the trees which are regarded as essential in the designing of a well laid out highway have been subject to ruinous and ruthless destruction and mutilation, with no provision for replacing them.

It is my view, in order to permanently maintain well-developed trees on the public highway where wire and other similar services will necessarily find a place, it is essential that an increased right-of-way be provided and when this is done, I hope that we may be able to permanently maintain on such highways a better class of trees than has commonly been planted on them.

Yours truly,

W. A. McLEAN.

PLANNING ROADS TO INCLUDE TREES

By W. A. McLean, Deputy Minister of Public Highways, Toronto.

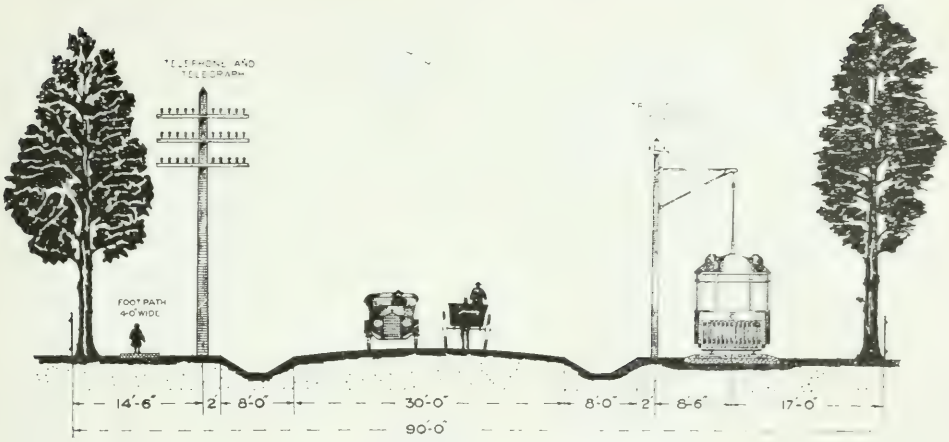
Main highways of to-day serve purposes not contemplated when originally surveyed and made their present widths.

Half a century ago the use of roads was confined to one service—the comparatively slow horse-drawn traffic. Roads in the first surveys were made forty feet wide, but this was found too narrow. Soon a width of sixty-six feet was adopted, as in England, and was made the general standard of the province. This was ample to provide a roadway, drainage, footpaths, and rows of trees, the natural complement of an attractive roadway.

To-day, in addition to horse-drawn traffic, the fast-moving motor, the heavy motor truck, require an added width of roadway for ordinary safety—safety not alone for the car, but rather for the horse-drawn vehicle. The telephone line (sometimes two or more competing companies), the telegraph line, electric light and power lines, sometimes the electric railway, demand a place on the main highway if public requirements are to be adequately served. The foot-path, owing to the amount and dangers of motor traffic, becomes a necessity where not previously required.

As a result of the encroachments of these services, the magnificent rows of trees which formerly lined many of the roads have been cut and disfigured, in the end destroyed, in order that the needs of telephone and other wiring systems may be met. Property owners, knowing the ultimate fate of trees, are discouraged from planting them along the highway. It has become apparent that, if trees are to be permitted on main routes of travel, a width of 66 feet or less, where all services are carried, has ceased to give sufficient room, and greater width is needed.

The widening of the Provincial Highway system can only be attained through the loyal cooperation of interested property owners. The additional amount of land required is comparatively small. To widen a 66-foot roadway to



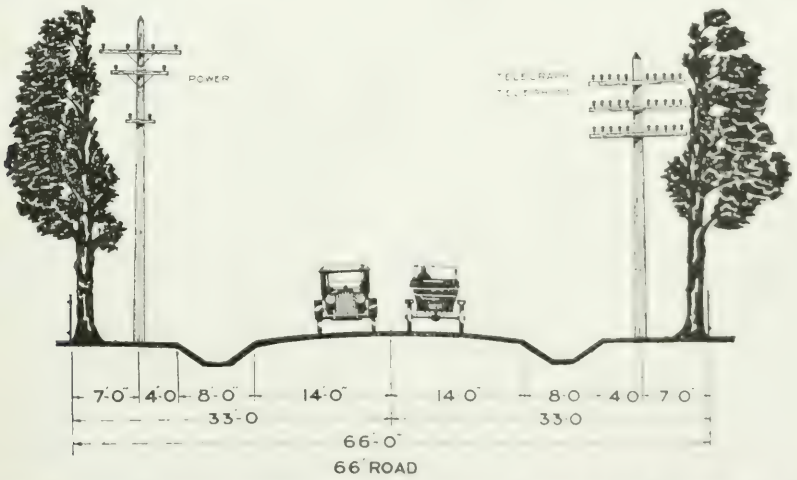
This section indicates a suitable arrangement where an electric railway is on the road allowance, a ditch between the roadway and the electric line reduces the cost of road maintenance and provides increased safety. A width of 90 feet gives sufficient width for the preservation of trees.

86 feet requires approximately two and one-half acres per mile. This acreage per mile means a very small area from each farm. Where electric railways are now in existence or anticipated, a width of at least 90 feet is desirable. Unquestionably a farm fronting on a wide, safe highway, carrying a full complement of telephone and power service, a convenient foot-path, and lined with trees, is benefited thereby much more than the value of the additional land necessary.

In an important sense, the land is not taken from the front of the property, for the travelled roadway is no nearer to the buildings; and the farm still has a front, but on a better and more imposing highway.

The co-operation of property owners should therefore arise from self-interest, as well as from a spirit of patriotism in attaining a work of such manifest public and private advantage—a work of which the province as a whole may well feel proud.

While co-operation is sought, the Department feels it desirable, on behalf of Provincial benefit, to pay property owners for the land an amount which will be equitable and relieve them of temporary inconvenience. But the Department does not feel justified in entering upon a large expenditure for this purpose, in view of the benefit directly accruing therefrom to those from whom the necessary but small amount of land is bought.



On a 66-foot highway, where adequate width is reserved for road and roadside [illegible] that trees are subject to destruction to meet the needs of telegraph, telephone and power services.

SHADE AND ORNAMENTAL TREES.

The object of the Department is to beautify the Provincial Highway—not to destroy beauty. Existing shade and ornamental trees will not be unnecessarily cut or injured. Trees will be conserved—not wasted.

Where no trees are now growing, the standard cross-section can be closely followed in tree-planting. Valuable standing trees, on the other hand, will be preserved as far as possible, and the general design of the road modified to this end. A desirable variety will thereby be created on the highway.

The cutting and mutilating of trees by telephone, telegraph and power companies will be guarded against, and proper pruning insisted upon.

Trees are objectionable along a macadam or gravel road only when so planted as to exclude an amount of air and sunlight necessary to dry the roadway, or when the roots interfere with drainage. To this end trees planted by the Department will be at the greatest possible distance from the roadway—at the margin of the road allowance. They will not be planted too close together, will be pruned upward to admit air and sunlight, and the denser varieties of shade trees will be avoided.

NEWS OF FOREST ENGINEERS.

Capt. L. M. Ellis has been appointed chief forester of New Zealand, and will be in Canada some time in January en route to the scene of his new activities. Capt. Ellis, since his graduation from the Faculty of Forestry at Toronto, has been connected successively with the Dominion Forestry Branch, C.P.R. Forestry Branch, the Canadian Forestry Corps in France, and the forestry work of the Board of Agriculture for Scotland.

Capt. H. R. Christie, having returned from service in France and in Siberia, has been appointed Assistant Provincial Forester of British Columbia.

The British Columbia Forest Branch has recently undergone a reorganiation of its administrative machinery which will add greatly to the efficiency of its work. The general salary scale has been revised upward in a way which sets the pace for all other forestry organizations in Canada, and will tend strongly to attract and hold able men, instead of compelling them to seek employment elsewhere.

WHAT ARTIFICIAL SILK IS.

Artificial silk is practically the same substance chemically as natural silk, the retort and test tube of the chemist having been called upon to convert wood pulp into cellulose and then into silk by mechanical processes, just as the silk worm within its body converts the mulberry leaf into cellulose and then spins its cocoon.

In general, wood pulp is converted into cellulose by treatment with caustice soda which forms a sodium cellulose, and then is dissolved in carbon bisulphide. This product, alkali-cellulosexanthate, is popularly known as viscose, used in another form for open-faced envelopes, and is ripened and filtered then forced through minute openings in a metal plate into a solidifying solution, the thread then being about the same consistency and form as the threads of the silk worm's cocoon. The artificial silk goods are sometimes harsher in feeling than the natural, but advanced manufacture is rapidly eliminating this defect.

B. C. DUES INCREASED.

Royalties exacted by the British Columbia Provincial Government on cut timber and logs have been increased to the amount of thirty-seven cents per thousand feet, commencing with the new year.

Following the compilation by the Forest Branch of the Department of Lands of the average wholesale selling price of lumber over the period of the past five years, the increase was was decided upon, it being found that with the advance in lumber prices by the mills the above increase was warranted.

The increase is made by virtue of the Timber Royalty Act passed by the former Conservative Government in 1914, by which it was provided that a definite plan of fixing the royalties to be paid should be made effective, thus affording some security to holders of timber areas and lumbermen who would thereby have reasonable knowledge of what royalties they would be called upon to pay into the provincial exchequer. It was provided that the increase in royalties in future would be based upon the average wholesale selling price of lumber over periods of five years each, the average selling price to be ascertained each year f.o.b. at the mills. The present increase is based upon the first five years' period since the act came into effect.



What community would not like to turn a barren neighborhood into a picture like this? From a photograph taken in a pine, maple and elm grove in Western Ontario.

$345,000 TO GUARD ONE ACRE.

If the suggestion of a settler in Northern Ontario as to the best method of putting out forest fires had been acted upon by the Department of Lands, Forests and Mines, the Provincial Treasurer would have had to impose a special ta xto meet the financial expenditures of the current year. The Department is in receipt of a letter from a settler suggesting that the best method of utting out the fires would be to drop bombs of carbonic acid gas on the burning areas. It is figured out that it would cost the province $375,000 an acre to extinguish fires by this method.

PRINTING ON SHINGLES.

The Daily Journal, one of the larger Illinois state newspapers, is being printed on wrapping paper because of the general newsprint scarcity. It is recalled that a newspaper in Memphis was once issued on wall paper. The same material was used, however, by a Dawson City publication ,and some time ago an American western journal was printed on a shingle.

RANGERS CARRY HERBARIUMS.

Equipped with small herbariums, the forest rangers on their tours of one of the United States western districts will henceforth gather specimens of all plant species encountered. Turned in at supervisors' headquarters, these will be mounted and described for public reference. Stockmen using the national forest ranges may become familiar in this way with all the forage plants in the region, and will be able to guide their grazing herds away from areas infested with poisonous weeds.

H. R. MacMILLAN'S NEW CORPORATION.

H. R. MacMillan, former Chief Forester of British Columbia, has formed the H. R. MacMillan Timber Export Company, with headquarters at Vancouver.

W. J. VanDusen has resigned from the British Columbia Forest Branch to become connected with this new concern.

P. Z. Caverhill is now in charge of the Vancouver district, succeeding Mr. VanDusen.

FLYING SCOUTS IN FORESTRY HAVE COME TO STAY

By Stuart Graham, who managed the aviation work for the St. Maurice Forest Protective Association.

First Summer's Experience Demonstrated Practical Value of Flying Machines to Central Quebec.

A complete report of the work done by the flying boats loaned by the Department of Naval Affairs, Ottawa, to the St. Maurice Forest Protective Association, Limited, working in conjunction with the Department of Lands and Forests of the Province of Quebec, has been compiled and is of considerable interest. The action of the Department of Naval Affairs in making it possible to carry out this work is highly commendable.

The work has of necessity been carried out along experimental lines, owing to the required initiation of lumbermen into flying work and also the introduction of the flyers into the realms of the forester.

The actual forest flying was materially handicapped in many ways, and over fourteen hundred miles were flown on two trips from Halifax to the St. Maurice Valley. These two trips were the longest cross-country journeys ever accomplished by flying boats, and as landings were made with equal success on ocean, lake and river, it speaks very highly of this type of aircraft for work in Canada where we have such a large percentage of water.

LANDED ONCE IN STUBBLE.

On one occasion, owing to a heavy gale in combination with a "dead" engine, one of the boats was forced to land in a stump-covered clearing. Mr. Ellwood Wilson, one of the passengers on this flight, states that the shock of landing was not felt, and the paint on the bottom of the boat was not even damaged on contact with terra firma. Although demonstrating that the sturdy flying boats are as good on land as water, this was not practised during the season.

Technical points in the report have been omitted, but the following excerpts are of special interest.

"The machines became water-logged from lying in the lake after flights, and owing to the peculiar construction of the hull of the Curtiss HS 2 L Flying Boat, it is impossible to remove the water from certain parts without placing the machine on terra firma and unscrewing drains on bottom of boat.

"On July 20th we endeavored to make a flight but found the machine too water-logged to leave the water, and as the launching track was not completed until a week later, the machine was obliged to lie idle during that time.

HALF-A-TON OF WATER ABOARD.

"Owing to a last minute change in the selection of a base, no preparations had been made for our arrival at Lac la Tortue, and the construction of living quarters, work shop, 125 foot launching track, and the necessary elaborate launching cradle-trucks, was very slow work for our personnel of five to perform without any outside labor. However, by working from daylight till dark, we managed to complete the track, and on July 26th hauled the machine out of the lake, when about 1,000 pounds of water was removed from the hull and fins. We were then able to understand why the machine behaved like a motor boat instead of an aeroplane.

"A few days drying out put the first machine in flying condition again, and on July 30th we resumed our patrol work which suffered no real drawback during the remaining three months. We made over forty trips and could readily have made more frequent trips had it been necessary. However, during these last three months only sixteen blazes were reported by the rangers of the Association, all of which were of minor importance, an area of only eight acres being burnt during the whole period. Ten of these fires were caused by railway locomotives, and were in the majority of cases discovered and extinguished by rangers following up the trains on "speeders." The cheapness and efficiency of this method of railway patrol will never be replaced by aircraft, although the latter may quite frequently be instrumental in spotting and reporting a fire from this source before the "speeder" patrol.

SPOTTING SMALL FIRES.

"That even small fires can be spotted and properly located from a distance of thirty or forty miles, we have frequently been able to prove. On Sept. 17th at 5.15 p.m. we noticed a curl of smoke rising from a point twenty miles to the south of us, between Lake Hamel and the

Mattawin river. Putting on all speed we were soon over the spot and the smoke proved to be from a fire by which some jobbers were preparing their supper, a camp in the course of construction stood a few feet from the fire.

"On July 7th at 4 p.m. we sighted a fire about a mile long on the River Croche, when forty miles to the south of the fire, and reported same to headquarters on our return. A lake was situated not far to the west of the fire, to which we could easily have transported fire pumps and men, but we did not have sufficient fuel either aboard the machine, or at the base, to carry out this project. This was the only patrol made before the end of July, and after that date there was no fire sufficiently large to warrant the transportation of a motor fire pump. However, on October 18th, as a test, we stowed the Johnson fire pump and hose aboard the machine, and found it would be quite feasible to transport this equipment to any lake or river, which offered an open stretch of water for landing.

"During May, June and July, when we were unfortunately not able to carry out aerial patrols, 147 fires were reported by the rangers of the association; these fires burnt over an area of 41,312 acres. The first fire of the season occurred on May 8th and the last on Sept. 5th.

From the above it will be seen that the fire patrol we were able to effect, would not in itself warrant the payment of a sum equal to our season's expenditures. In view of this the following points must be thoroughly considered —We have shown that fires can be sighted from aircraft, and rapidly reported or extinguished, in an efficient manner that could never be achieved by other means. We have proven the value of aerial photography, and shown the cheapness of this method of mapping. With the small personnel at our disposal, we have constructed the necessary station equipment for the carrying out of flying with the boat type machines ,and have found out and overcome most of the faults of the machines. In short, we have carried out experiments which will enable us to resume the work at the beginning of the next fire season, without hindrance; and with two machines and two pilots in the field, to maintain as constant a surveillance of the lands under our care as is possible.

PHOTOGRAPHY FROM ALOFT.

The second aim in the work was to prove the worth of aerial protography taken over timberland, in ascertaining the detail with which the various types of timber, and the topographical features, would be shown. We endeavored to secure an up-to-date camera for this work, but manufacturers were still engaged filling government contracts, and it was impossible to secure one from any source. We secured an inferior out-of-date camera, and with this and various others, we made several hundred exposures, all of which proved unsatisfactory for our purpose.

Ice was forming on the lakes and we had flown through several blizzards before our long promised "real" camera was delivered, but we began with greater zest the work with this new apparatus. This was the Eastman Kl Aerial camera, 100 exposure, 18 cm. x 24 cm., actuated by a wind motor and automatic in operation. At the height we were flying, 5,000 feet, we secured a map of the country three-quarters of a mile wide and sixty miles long with one film, the resultant scale being 400 feet to the inch. Before the lakes became entirely frozen over, we were able to secure three hundred and eighty negatives, portraying all types of country. The results of these pictures exceeded all expectations, watersheds, and their drainage, swamps and burnt-over lands are all accurately shown. The hardwood is readily distinguished from the coniferous, and the differences in size of growth are readily noted. Pine is easily spotted from other coniferous types ,and as our experience increases in the interpretation of aerial forest photographs, they will undoubtedly become a great deal more comprehensive, and innumerable other valuable features will be disclosed. It must be remembered that this is a new study, and I feel sure that the contentions of even the most optimistic will be exceeded when the work has been given thorough study.

PASSENGERS CARRIED.

A number of lumbermen accompanied us on our patrols at various times. These gentlemen were representatives of the various branches of work connected with forestry, company managers, foresters, logging superintendents, and explorers. In each instance these men were greatly impressed with the possibilities of the work.

DISTANCE FLOWN.

The total distance covered during the season has been 6,000 miles ;of this total, 1,500 miles were flown while coming from Halifax and during test trips. A distance of 4,500 miles was flown on patrol work, and the mean visibility found to be twenty miles, which aggregates 180,000 square miles of territory patrolled.

PROPOSED OPERATIONS FOR 1920.

It would not be fair to make an estimate for next season based directly on the work we have carried out during the past season. The co operation we have been able to secure has been slight. Mr. Ellwood Wilson, chief forester of the Laurentide company, gave us at all times his earnest support and ready assistance, and maps, canoes, tractors, chain blocks, steel rails, and numerous other equipment was gladly loaned us by the Laurentide company; and I fear that without this individual assistance, the success of our season's work would have been still more handicapped.

During the next season, with two pilots, our patrol time will probably aggregate more than four hundred hours, or a patrol over forty-five thousand square miles of territory a week. This weekly total will, of course, vary according to the requirements of the work. A camera will be carried during all photographic weather, and as much territory will be mapped by this means as is possible.

WHICH TYPE OF MACHINE?

For the work we have been called upon to perform during the season, the Curtiss HS 2 L Flying Boat is undoubtedly the best obtainable at the present time. The varied country over which we have to operate would not warrant the use of too light a machine. It is true they might fly at high altitudes, but we are called upon to make landings on lakes and rivers at any time, and I recall one occasion when we landed on a long narrow lake which had cliffs on both sides rising sheer to twelve hundred feet above the water, a heavy cross wind was blowing, and the agitated state of the air for the first fifteen hundred feet of the climb can be well imagined.

A machine weighing three and a quarter tons, equipped to carry three passengers, could hardly be called efficient, and the HS 2 L is not as efficient as a machine of its power should be.

The ideal machine for work on inland waters is, in my opinion, one of the fuselage-float type, a twin tractor, each motor being one hundred and sixty horse power, with a fuel capacity for not less than four hours' flight. This would allow of carrying pilot, passenger, and considerable extra load. The fuel consumption with his type of machine would be slightly more than half that of the Liberty 33 H.P. as fitted with Zenith carburettors.

Cradles are not necessary for launching or beaching fuselage type machines, a flat truck being all that is required. In the event of one or both floats of a seaplane being punctured by contact with logs or rocks, these can readily be removed and new ones substituted in a few hours; whereas damage to the hull of a flying boat puts the machine out of action for a considerable period. Seaplanes are not, however, as seaworthy as flying boats, and should not be considered where very rough water is to be encountered.

At Riviere du Loup on June 7th, with a heavy sea running, cross tide and wind, we spent a very disagreeable few minutes in the open river trying to "take off." Once the machine buried its nose in the waves within a few feet of the pilot's cockpit, and gallons of water streamed into the front cockpit. This was worse than a straight sea running twice its height, and it was only by getting under the lee of the breakwater, that we avoided becoming swamped. A seaplane in a similar position would probably have sustained damage.

N. S. FORESTS UNDERVALUED.

Halifax.—Hon. O. T. Daniels has made a discovery in regard to the value of the forest resources of Nova Scotia. Hitherto, the statisticians have been putting this value down at $5,00,000 annually. Hon. Mr. Daniels says the value is $19,500,000. According to him, those who have been computing the value have been consistently omitting very important items. It appears that no one thought it worth while to seriously consider the value of cordwood as an article of consumption, in this province, but Mr. Daniels puts this item down at $5,000,000, equal almost to the entire value previously estimated by those who wrote on the subject of timber. Mr. Daniels estimates the value of Christmas trees, for instance, at $50,000 a year. Pitprops, telegraph poles, and a score of other smaller articles previously forgotten, he brings in to swell his aggregate to within a fraction of $20,000,000 a year.

It may be that other natural resources of the province have been similarly underestimated. Hon. Mr. Daniels is the attorney-general of the province and a lawyer. His figures showing the unexpected importance of our forest industry, will not be unpleasing to the people of this province, and may be somewhat of an eye-opener to citiezns of other parts of the Dominion.—Financial Post.

CAMPHOR-FARMING

There is no reason why America should not ultimately grow its own camphor, and considerable progress has already been made toward this end. The earliest camphor farm is now 36 years old, and the largest, including some 12,000 acres. Both of these are in Florida. The wasteful Chinese process of destroying the whole tree to reclaim its gum is not now followed. Only leaves and small twigs are harvested, and a camphor-farm is treated, not like a timber-forest, but like an orchard. We quote below from an article in the Du Pont Magazine. Says the writer:

"With the approach of winter housewives begin to arrange, on the cupboard-shelf, various home remedies that are us useful when the youngsters exhibit the first evidence of colds. You may depend on it that a 'camphor' bottle will stand in the front rank. There is nothing of apparent interest in the crystal-clear liquid except its medicinal properties, yet in its manufacture there are several interesting facts that the average housekeeper knows little about. The youngsters know only that it is good for colds and that, when compounded with sugar on a teaspoon, the dose contains far too little sugar in proportion to the camphor, even if only a drop from the bottle is added.

"A great deal of the camphor used in the United States is imported from Japan and the island of Formosa. However, the camphor industry in China is an important one, in which both family and governmental interests are involved. Families are principally interested in the joint ownership of trees. It is not uncommon for a family that numbers as many as two thousand people, considering both direct and collateral relations, to hold an equity ownership in a single camphor-tree.

"Before such a tree can be sold, however, a license must be obtained from the central government authorities, and also from the local officials. After permission to sell a tree is secured the sale takes place, and the proceeds, which average $225 for a tree, are divided among the owners with regard to their several equities.

"Unfortunately, in China the practice of manufacturing camphor results in the destruction of the tree. First the tree is felled and the trunk chopped into small pieces or chips of convenient size for the retorts. When the retort is filled, water is added, and a fire is built to carry on the simple distillation process. The camphor volatilizes under the action of the steam, passes through a condenser, usually a bamboo-pipe, and terminates in a wooden tub of cool water, where it is collected as camphor and camphor-oils. It is a primitive process in China and a wasteful one, for although the upper branches and leaves do not contain as much camphor as the larger members of the tree, the Chinese lose some of the product when leaves and branches are used for fuel."

Notwithstanding the primitive means employed and the loss of part of the product, the average yield of a tree, we are told, is about one-half ton of camphor—enough to provide spirits for every household in a large city. To quote further:

"Some camphor is being produced in this country, and it is believed that eventually American production in Florida will suffice to take care of domestic needs. Thirty-six years ago the United States Department of Agriculture purchased a tract of 3,000 acres near Palatka, Florida, and planted camphor trees in long hedge-rows. This camphor farm is to-day a splendidly developed area. Hedge-cuttings are gathered once or twice a year and distilled in accordance with modern chemical practise. By this method the life of the hedges is preserved and the product can be obtained annually for many years. Considering that the life of the camphor-tree in China is about five hundred years, there is little fear that the industry in America will be short-lived, for the trees thrive as well in certain favored sections of Florida as they do in China or other sections of the East.

"In 1913, the Arlington Company, now one of the Du Pont American Industries, purchased a tract of approximately 12,000 acres at Waller, Florida, as the starting-point in developing a large camphor-farm. This is probably the largest acreage devoted to camphor-growing in America."

FORESTRY AND IRRIGATION INTERDEPENDENT



Natural Storage Provided by Tree Growth Absolutely Essential in the Canadian West.



The following information regarding forestry and irrigation is taken from an address before the Winnipeg Rotary Club by Mr. Robson Black, Secretary of the Canadian Forestry Association. In view of the fact that the Western Canada Irrigation Association at its annual convention, drafted a resolution to th egovernment urging compulsory tree planting by the farmers on the western prairies, and suggesting a small tax, which would be remitted when the trees were set out, it is of interest.

The Dominion Government is spending annually more than $700,000 on the protection and administration of western forests, and the wood resources of the three prairie provinces outside of the Dominion forest reserves are in a state of progressive deterioration. Eighty per cent of the west's original inheritance of splendid forests have been destroyed by fires.

TIMBER GROWING PROFITABLE.

Over one-third of the province of Saskatchewan, and half of Alberta are adapted by nature to the profitable growing of timber, and in view of the experiences of the eastern provinces, and European countries, offer possibilities that might rival profits from grain. The day of forest butchery must cease and scientific management and replanting be introduced. The European practice which regards the timber tract as a source of permanent crop should be adapted to Canadian conditions.

Whilst such a large portion of the prairie province is non-arable, forestry must be practiced unless these vast areas are to hang as millstones about the necks of the grain producers. Forests must be grown as a cheap source of timber and to establish in northern localities pulp and paper mills, when the exhausted limits of the east force the paper industries to take up manufacturing in the north of the prairie provinces. This constitutes one of the strongest hopes of industrial development in these provinces. So scarce has spruce become that any province containing tracts in commercial quantities can attract industries to it and turn wildernesses into thriving industrial centres.

The great development of the past few years along the lines of irrigation, and the demand for further extensions must not be overlooked in the pleas for scientific forestculture. Irrigation projects in the western provinces are all hinged upon the management of the provincial forest areas. Without the natural storage provided by abundant tree growth at the sources of the streams, the distribution of water to the millions of acres in the dry belt is an enterprise of almost prohibitive cost.

At many of the meetings of the Canadian Forestry Association in the western provinces during October, the following telegram from Col. J. S. Dennis, Chief Commissioner of the Department of Colonization and Development of the Canadian Pacific Railway, was read. Col. Dennis, who is an ex-president of the Forestry Association, and also may well be called "The Father of Canadian Irrigation," sent the message at the Secretary's request:

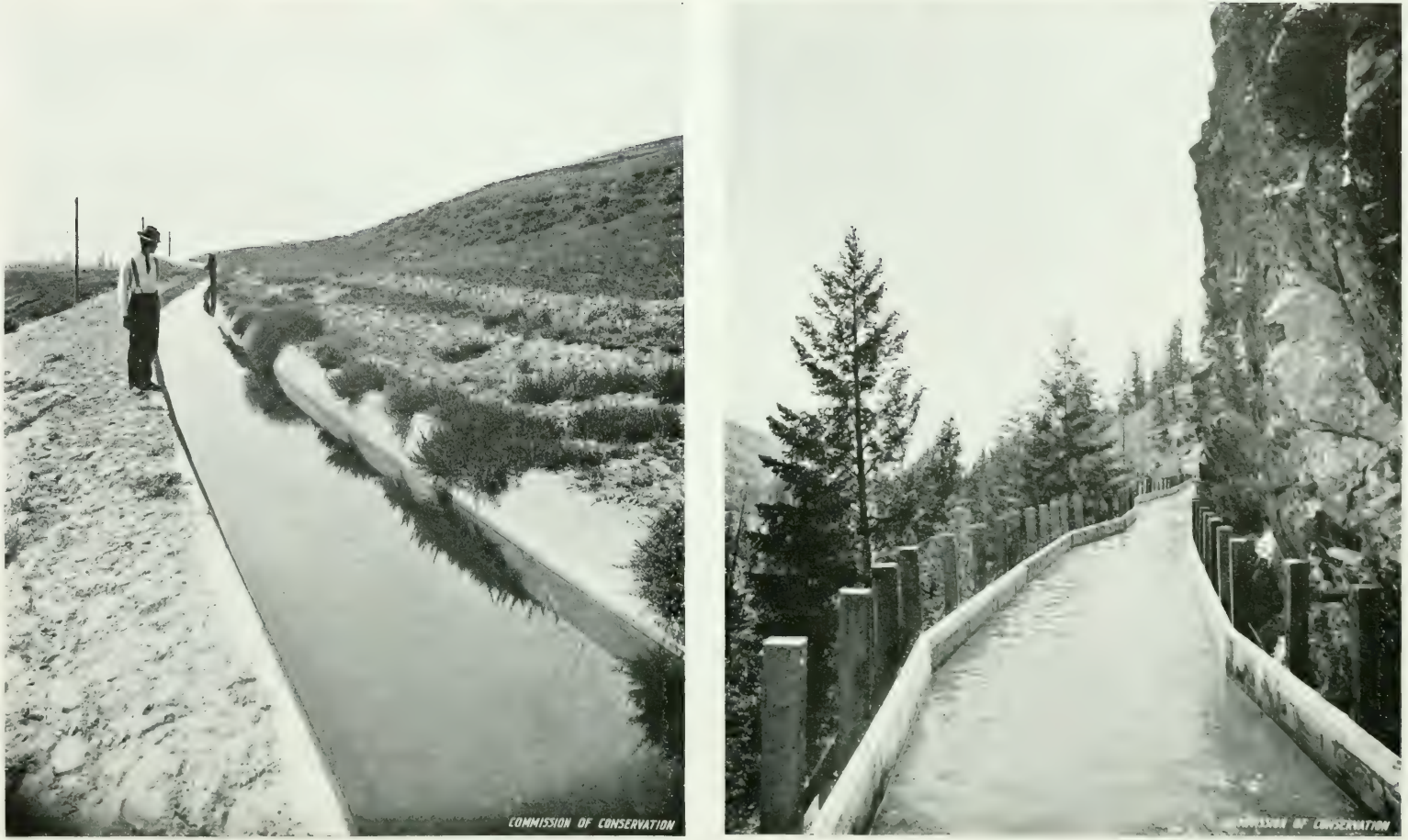
"The destruction of timber on the eastern slope of the Rocky Mountains and on other drainage areas in the west through fire is a serious menace to the successful operation of existing irrigation systems or their extension in southern Alberta or southern Saskatchewan and in the continued supply of water in drainage channels for stock watering. This is due to the fact that when timber and underbrush on drainage areas are destroyed the run-off from these areas is lost through floods with incidental damage, at periods of the year when it should be given off slowly to be of use for irrigation or stock watering.

"In my opinion one of the most important matters in the west to-day is to make every effort to prevent destruction of timber on our timbered areas through forest fires."

This he has followed up by the following article:



TYPICAL VIEW OF CANADA'S DRY BELT COUNTRY.
The Valley of the Thompson River. Note scattered timber on the slopes and thicker cover near the summits of the hills, also dry appearance of the soil

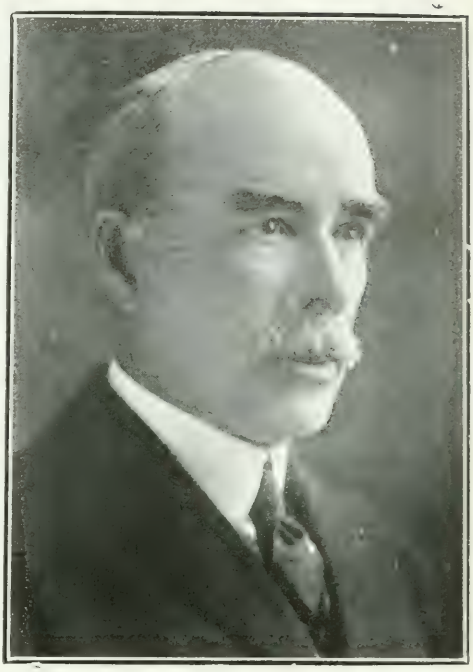


How water is sometimes carried in Western Canada for small power and irrigation purposes. The first picture shows a ditch lined with concrete, the second, a wooden flume skirting a mountain side

THE POLICY OF IRRIGATIONISTS.

By Col. J. S. Dennis.

It has always been the policy and endeavor of irrigationists who thoroughly understand the basic conditions governing an adequate and regular water supply ,to protect our forest areas, and by every means of co-operation with the Department of Forestry, keep wooded areas on water-sheds in a thriving state of growth by fire precautions and reforestation. Every important convention of those interested in irrigation in Canada has drawn up resolutions to protect existing forests on the water sheds of all streams available, or likely to become available, not only for agricultural purposes, but for domestic and industrial use; and to replant denuded areas at the heads of streams so that the sources of the supply of water for all purposes may be maintained for ever. Conventions have urged the establishment of greater fire precautions against devastation by fires, and the increase of fines in the cases of convictions against travellers, campers and settlers who have occasioned the conflagrations. A few years ago the efforts of irrigationists were largely instrumental in securing the reservation of the Rocky Mountains Reserve area, comprising more than 13,000,000 acres on the east slope of the Rockies, and of enormous value to the watershed supplying the rivers and creeks of Alberta and the adjoining prairie province. The association also succeeded in having the reserve of the Cypress Hills enlarged.



COL. J. S. DENNIS

Chief Commissioner of Colonization and Development, Canadian Pacific Railway.

WATER-SHEDS MUST BE PROTECTED.

Forestation and irrigation are allied and interdependant, and for this reason water-sheds must be protected. It has been established beyond all doubt that forestation has a considerable effect upon precipitation, and moderates and regulates the flow of moisture in the spring, minimizing the danger of floods, and storing up the melting snow in its springs and vegetable mould. Precipitation is induced in air which has almost reached the point of saturation by contact with some obstruction or the lowering of the temperature. The forests exert a great influence in both ways. On mountain heights their effect may not be very apparent, as the mountains themselves from the necessary obstruction, but their cooling influence is greater than that of the sun-baked mountain sides, and this is found to increase with the elevation. In level country the influence of a large area of forest is more marked and its cooling and obstructive effects come into play without the aid of any other agency. Extensive observations in Europe have been made on the influence of forests on rainfall most of which have been quite conclusive in their affirmative results.

CONSERVATION OF MOISTURE.

Forest areas have a greater influence upon the run-off by preventing the rapid melting of snow in spring. In the cooler areas of the woods the snow remains upon the ground for a much longer period and gives off its moisture more gradually. The retarding of the spring floods in this manner not only materially decreases their powers of destruction, but conserves the moisture which appears later as springs. Again, the water flowing from the melted snow, or from showers, is not rapidly seeped in by the rich humus of the forest floor, but is held by the covering of twigs and other vegetable matter which has an absorptive capacity of fifty per cent of its own weight. From this the water is given up slowly or percolates through the earth to springs and streams. It should be taken into account here that a foot of this vegetable covering takes centuries to produce though a single day of forest fire or rush of water by forest clearing will effectively

destroy it. Trunks and roots of trees also present effective obstruction to the flow of the moisture from glaciers and snowfields. The roots, penetrating deeply into the earth, open up channels for the sinking of moisture to the lower strata and reach through these lower levels, springs and streams, long after the surface flow has gone.

Forest growth then has a regulating and moderating effect upon the extremes of the flowings of water, and it is these qualities which govern the value of water courses throughout the year. To assure a sustained and regular flow to the streams, the forests, with their protective and regulative influence, must be carefully guarded and maintained. This can be most effectively done in the following ways:

By effective protection against fire; by an adequate service of fire rangers and the construction of fire guards; by confining settlement to fertile valleys and keeping hills and mountain slopes where agriculture is less successful, under tree plantation; by the more careful cutting of timber under skilful surveillance; and by the reforestation of denuded or burnt-over areas.

FORESTRY IN THE UNION OF SOUTH AFRICA

Cape Town, December, 1919.—The South African Journal of Industries, in a recent number, gives an interesting article on Forestry in the Union of South Africa. Insistent demands having been made for some years past by all sections of the community that a comprehensive programme of afforestation should be embarked on, the Union Government decided at the beginning of the year 1918 to place a sum of £50,000 on the loan vote for this object.

The Chief Conservator of Forests sets out the position of the Union in regard to natural forest resources, the present acreage of government plantations, and the schemes of afforestation which are being undertaken.

NATURAL FOREST RESOURCES.

In 1913 ,the last normal year, the Union imported 17,500,000 million cubic feet of timber, worth just short of £1,250,000 sterling. Nearly 90 per cent of that was coniferous timber, i.e., soft timber, and the Chief Conservator of Forests estimates that eve nif fully developed, the natural forest resources of the Union will never likely be able to supply 5 per cent of the requirements of the country.

Assuming, on a very conservative estimate, that an acre of plantation will yield 100 cubic feet of timber per annum, the report points out that it will take 350,000 acres to produce the probable requirements of the country in fifty years 'time. At present there are only 70,000 acres of government plantations in the Union, and of these 20,000 acres are for special purposes, as, for instance, 7,000 acres in the Transkei to provide hut wattles for natives. From the foregoing the need to press on with afforestation schemes is apparent.

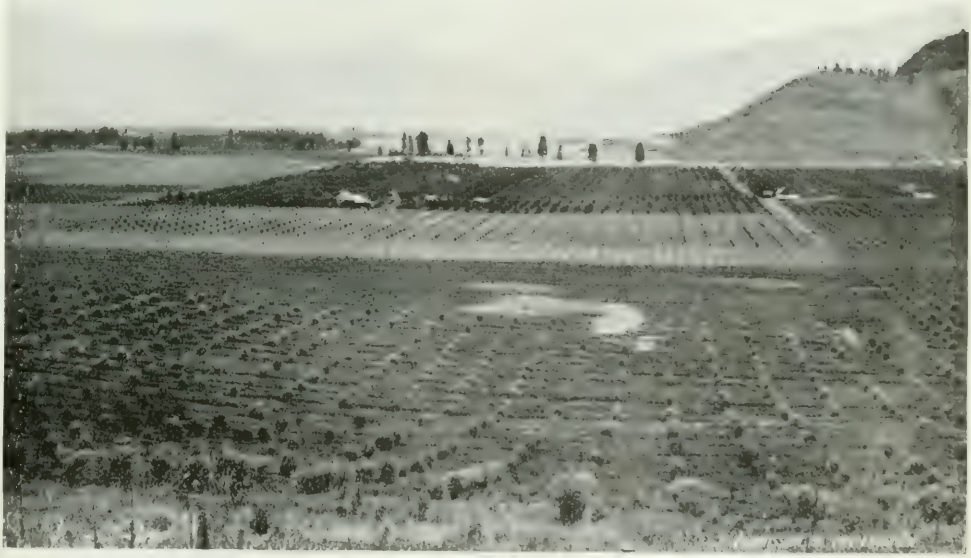
With the extra funds now provided, certain projects have been selected and started. The work is being confined mainly to mountain land, which is of little value for any other purpose, but the question of accessibility for easy distribution of timber has not been overlooked.

ANNUAL MEETING CANADIAN FORESTRY ASSOCIATION

Chateau Frontenac, Quebec **Tuesday, February 3**



Kettle River, above Grand Forks, B.C., showing irrigation flume and railway.



Lower Kettle Valley, near Grand Forks, B.C. This land is under cultivation by [illegible]

SYSTEMATIC TREE PLANTING IN COUNTRY PLANNING

By W. W. Andrews, LL.D., Regina.

Town planning is the policy of taking a long look ahead in municipal affairs.

It is the intelligent adoption of a plan for a town, or section of country which may take 20 years or more to complete, but every year may be made an approach to its realization.

The object of town and country planning are:

1. Efficiency and economy.
2. Health, and conservation of life.
3. Beauty and culture, or in a word the enrichment of life.

It seeks to make community life richer, happier, fuller, by wide-awake forethought and appreciation of human interests.

The special feature I wish to bring out is this, the systematic protection of our prairie roads and farms by tree planting. The form recommend is planting of continuous rows of carraganas and poplar and such sure growing trees, flanking the roads 50 or 100 feet back from the road line of each side and then as soon as possible a set of fine trees on the road line. When this plan comes to be fully carried out in any section it would mean that every road would be protected by four rows of trees and every section would be surrounded by four lines of trees. Probably when the immense benefits of this scheme were seen many farmers would plant a double row of trees at least 50 feet apart along the half-section lines.

TREE-PLANTING BENEFITS.

(a) To General Traffic.

1. Drifts from either side would never reach the roads after the third year.

2. With only the snow on the level to contend with in 90 per cent of our winter seasons our automobiles would be able to run as well in the country as in our cities.

This would release for the service of our people one million horse power in automobiles (rated at 20 horse power each) now idle almost five months of the year. This idle power will be doubled in ten years.

If gradually the guage of our sleds were changed, automobile traffic would be greatly helped.

3. The blizzard and dust storm would be greatly modified. Travel for children would be safe and for all safer and more pleasant. How greatly the winter school would benefit!

4. The prairie country would be like a garden. The beauty, homelikeness and general attractiveness of the country would be greatly enhanced.

5. This plan avoids the serious objections which arise from trees wrongly placed, in causing drifts too near the house and barn and along the roads and upon the ploughed lands.

6. In some cases, roads running diagonally of our survey, with a railway station as a centre would be of great advantage.

7. Roads opened up along the railways need protection on one side only.

(b) Benefits to the Farm.

1. Such protection would lessen the force of the wind and the blowing out of grain and the discomfort of dust storms would be greatly mitigated if not wholly prevented.

2. The scorching effect of hot winds on the grain would be lessened and the number of tons of water per day taken from a bare summer fallow of ordinary sie, by a dry wind under a hot sun would be greatly reduced.

3. The warmth of the day would blanket the fields longer after sunset and therefore the growth of grain would be accelerated.

4. The late and early frosts would be distinctly less harmful.

5. The 100-foot strip between the two rows of trees on account of its large share of moisture and its protection, the most valuable upon the farm for the growth of small fruits, silo crops, such as corn, alfalfa and roots, pasturage for young cattle and pig runs and garden stuff, as conditions dictated.

If the whole strip were given to trees it would probably pay handsomely if the varieties were well selected, for wood must always be dear in this prairie land.

6. The beauty, comfort, and attractiveness of the farm home would be enhanced. Witness

many of the older farms in Manitoba on plains originally wholly bare, where the home is found in the shelter of an encircling bluff.

HOW MAY PRACTICAL RESULTS BE OBTAINED?

1. Let the government grant $1,000 each to a town and municipality who together plant a ten mile length of road on both sides and have trees in condition to pass the inspector a year later.

2. Make a special piece of road an object lesson, say the forty miles between Regina and Moose Jaw.

3. Appoint an enthusiastic officer as forestry and country planning expert for the province, who will carry on propaganda, co-operate with municipality authorities, inspect tree planted areas and do all possible to develop the forestry possibilities of the province.

4. Encourage the establishment of municipal nurseries. Ten dollars' worth of seed a year will, in a few years, produce surprising results. The Forestry Journal reports that 1,000 seedlings a day may be planted by an adaptation of the cabbage-planting machine. As rows of trees to be satisfactory must be in almost unbroken lines, the best results can be reached by municipal action only.

5. Co-operate with school, church and community authorities in the matter of plans for tree protection around school buildings, churches and municipal buildings, parks and playgrounds.

6. Prepare exhibits of lantern slides showing the results of such country planning.

7. Where low wet spots are near the road, wells six or eight feet deep should be dug and filled up with boulders, or holes bored with post hole augers six feet deep and filled with stones, gravel, brush, etc., and covered over with soil. This has proved very effective both for grain and trees.

DR. BAKER FOR COMMERCIAL POST

The American paper industry has taken over Dean Hugh P. Baker, head of America's biggest forestry college, the New York State College of Forestry, at Syracuse, under conditions which indicate that America's timber industry appreciates the need for a study of future raw materials, and for men with a technical knowledge of forestry in industry.

Dr. Baker resigned Jan. 10 to accept twice the salary which he is now rated as receiving, to become secretary-treasurer of the American Paper and Pulp Association, with headquarters at New York. He takes up his new work probably about March 1.

The selection of Dean Baker for the executive officer of the parent association of America's great paper industry, means, according to Dr. Baker, a greater opportunity for the advancement of the principles of the forestry profession than is possible in any college. His letter of resignation outlines important phases of American forestry development of the past eight years, and also discloses that in the spring of 1919 he refused an offer of $7,500 from the outside, to remain as Dean of the college at a $6,000 salary.

"Canoes that have made Maps and History."

EXPLORERS, TRADERS, AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS.

When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

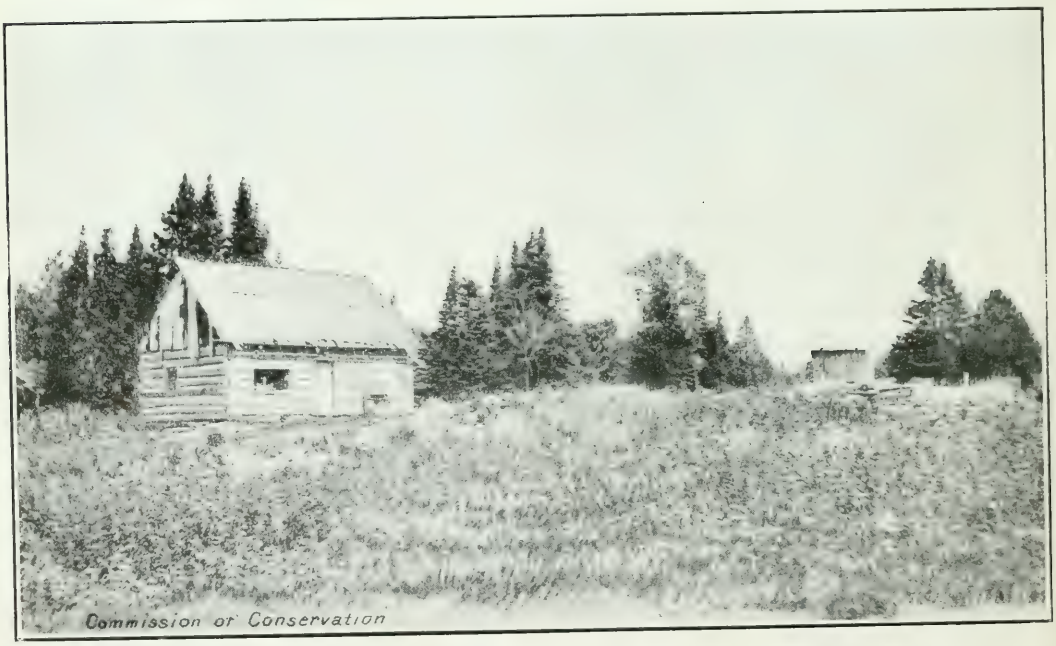
Write for Catalogue. It is free.

THE LAKEFIELD CANOE AND BOAT CO., LTD.

LAKEFIELD, ONTARIO, CANADA



A complete story in two pictures, illustrating a common Canadian blunder in land management and colonization. The photographs were taken of a section in the Trent Valley of Ontario where large areas adapted only to timber growing were thrown open to agriculture. An ambitious young farmer built his shack, cleared a few acres, secured a few crops, and then prepared for a happy future by building more commodious quarters, as shown in the lower picture. A year or two passed by and his land "pinched out." The soil was never adapted for field crops. Here we have an instance, unhappily typical of thousands of others, where Land Class ification would save an industrious settler from years of wasted effort. It would also retain such sections forever under their only profitable crop—timber.



PLAIN STATEMENTS ON CANADA'S FORESTS

By Frank J. D. Barnjum, Annapolis Royal, N.S.



A Discussion of the Limitations of the Nation's Wood Supply With a Suggestion as to Remedies.



(Mr. Barnjum, a practical and successful business man of Nova Scotia, owner of the largest timber limits in his province, began his studies of timberlands and the wood supply twenty-eight years ago when he made his first purchase of timber areas in Maine. He moved to Nova Scotia where for twenty years he has been extensively interested in timber properties.—Editor, Canadian Forestry Journal.)

The wood resources of Canada have been so grossly exaggerated that very few are aware how meagre our supply of available wood really is. I have spent a large portion of the past few years in a personal investigation of the Canadian situation, the results of which are so alarming that I have refrained from publishing my findings.

The theory of an annual growth that has been indulged in so freely in the past has simply become a popular delusion. There is, of course, a gross growth, and a net growth under some conditions, but to offset this the annual wastage by fire, wind, insects and fungi, taking the country as a whole, far over-runs the gross growth. Consequently we are simply consuming our capital year after year.

If anyone has any question as to the enormous amount of this wastage, let him explore the woods of Ontario, Quebec and New Brunswick, where one can travel day after day and see nearly everywhere the vast destruction caused by the spruce bud worm alone. There are millions of acres in these provinces where over fifty per cent of the standing pulpwood has been completely destroyed.

To emphasize further this question of growth, it is only necessary to refer to the recent reports on the growth in some sections of Quebec, which show only about 30 board feet per acre, meaning about one 6-inch tree per acre per year. It has never been disputed that there is no actual accretion in virgin timber, but the mortality more than offsets all growth. Furthermore, even in cut-over land when one realizes that it is only necessary to have an average of one ordinary sized tree per acre per year blown down, how easy it is to see that the annual growth is wiped out by this one process of destruction. I have seen thousands of acres laid flat by wind, not only in cut-over lands but also in so-called virgin stands. So much for wind.

Now with regard to the losses from forest fires, the spruce bud worm, borers and fungi. The figures are so appalling that I dare not commit the result of my findings to print, but these losses are so enormous that no one who is sincere will attempt to deny that they far over-balance any annual growth that there is in Canada or the United States. Cut out this mythical annual growth theory and what are we doing? As I said before, we are simply using our capital.

WHAT IS ANNUAL GROWTH?

One often sees the statement in print that we are "using more than three times our annual growth," while in fact, as previously stated, there is no annual growth to use, for the reason that enemies of the forest, cited above, destroy much more than the growth.

The timberland owner has the satisfaction of knowing that even if he has lost one-half of his standing timber, by the ravages of the spruce bud worm, still what he has left is worth double the previous price per cord, as the destruction is country wide, and the consequently diminished supply will necessarily create an immediate and substantial advance in land and stumpage prices.

If some of the paper mills of the United States had not gone so far afield for their wood last year by invading the more remote sections of Ontario and Quebec, where the freight alone amounted to $16.00 or more per cord and accepted wood down to a diameter limit of one and one-half to two inches, they would be short of wood to-day.

In some of the wild estimates of our supply of standing timber made in the past, they have simply taken the map of Canada, determined the number of square miles, and arbitrarily figured so many cords per acre. Now as logging by aeroplane has not been perfected as yet, there are only two ways you can get out wood, namely, by river or railroad. About all the more important rivers of Canada have been logged on and driven, from the very earliest days. Many of them have been practically stripped or cut out, while others are being operated pretty well back to their head-waters, so far remote that it takes two years or more to drive logs to the mills.

In the case of the railroads the conditions is pretty much the same, with the exception of, possibly, the Transcontinental, but inasmuch as this road was built beyond the height of land, there is very little wood available north of this road, as the rivers all drain away from it towards Hudson Bay. This leaves only the territory that lies south of the railroad, but as sawmills are springing up along this line, like mushrooms over night, and as fire is taking a heavy toll in this section, the paper mills will derive only a small supply from this source. Every time a railroad is built in a wooded country, more wood is burned up than is hauled out.

When talk is made about obtaining pulpwood from the cold northern sections that have not been opened up, where it takes 150 years to grow a four-inch tree, where the snow falls to a depth of 15 feet, and the thermometer registers 50 below ero, it will be only when pulpwood reaches a price more than $75.00 per cord. We hear Alaska suggested as a possible field for the making of paper, but all of the above handicaps apply to this section, except along the coast, as well as the fact that it is 4,000 miles distant from the large paper consuming market.

All anyone needs to know is that in the United States more than 5,500,000 cords of wood are used annually for pulp alone, in order to realize that this appalling shrinkage in our capital stock of standing timber must necessarily too soon wipe out the remaining supply.

WOODPILE 9,000 MILES LONG.

I want the reader to pause a moment when he reads this paragraph, five million five hundred thousand cords—not feet, but cords, used every year in the United States for pulp, and principally in the Eastern and Middle States. Few can realize just what this really represents, but to try and make this comprehensible, it means a solid pile of four foot wood, twelve feet high reaching clear across the continent, or a pile four feet high, nine thousand miles long, and yet we may travel for days on the railroads and hardly see a spruce tree. Personally, I should not want to take the contract to furnish this amount for even one year, and where is it to come from after the next ten years?

Imagination can hardly grasp the real significance of the terrifying estimate of the annual consumption of all lumber in the United States alone, namely 244 million cords. This estimate of consumption is doubtless conservative, as it is impossible for the government to obtain complete reports of all actual production.

In addition to this enormous amount that is being cut, fire is taking a terrible toll as well. Over a billion feet of lumber was destroyed this present year in just one state—Montana. This means two million cords, or nearly half the entire amount consumed for pulp in one year, destroyed by the fire fiend in one state. Last year the same thing happened in Minnesota, and this same thing has been going on since this country was first settled and to such an extent that 75 per cent of the original stand of timber has been destroyed by this same cause, and yet some authorities will still talk of an annual growth.

It is a curious fact that some of the coldest sections are the most prone to fire, such as Newfoundland, British Columbia, Northern Ontario, Northern Quebec, Minnesota, Alaska, etc. These fire zones are just as well defined as land and water.

PAPER MILL APPETITES.

In many of the estimates that have been made as to the length of time our standing timber will last, the important question of the increase in consumption is quite overlooked, and as showing what an important factor this is, I will simply cite a five-year period in the St. Maurice Valley, where the increase amounted to 300 per cent, or at the rate of 40 per cent per year.

Thus far I have largely discussed principally the pulpwood consumption, and yet when you add to this the extraordinary demand we have in sight for lumber for new construction the world over, it simply adds to the danger that is facing this country from a premature exhaustion of a supply of raw material for our magnificent paper mills, which to-day are the second most important industry in Canada, and which with a proper and judicious guarding of our raw material, will shortly occupy first position.

The paper mills which have a wood supply will make large profits in the future, as there

are so many American mills which have no supply of their own and will be forced out of business on that account, which will make a continued shortage of paper from this time on. Furthermore, no government can for any length of time, interfere with the natural law of supply and demand, or make a spruce tree in less than 50 to 75 years.

As showing what effect lumber and other products of wood may have on the price and scarcity of pulpwood, I will simply note that in some sections, owing to the abnormally high price of laths, pulpwood is being sawn into laths netting from $30.00 to $35.00 per cord for the wood at point of shipment.

In an article which I wrote three years ago when the publishers were complaining of 2¼ cents paper, I then stated that the question of the future would be not one of price, but of obtaining paper at any price.

That prediction has already proved only too true in a much sh orter time than I anticipated.

I have devoted the past 28 years to the study of the one subject of timberlands and wood supply, and during this period I have seen lands go from $1 to $15, $20 and up as high as $50 per acre for the same lands; and stumpage go for $1.50 for a mark of logs that only took four to the thousand, to the price of $20 per thousand for a mark of twelve to the thousand; pulpwood from the low price of four dollars to a high of thirty-two dollars per cord, and spruce lumber from a low of twelve to a high of sixty dollars per thousand. Stumpage in New Brunswick even has been sold as high as $15 per thousand during the present year.

A GRAPHIC CHANGE.

In 1890 they were cutting trees that took not more than six or seven to make a thousand feet of lumber, while to-day they are cutting to such a small diameter limit that in many sections it takes forty trees to make a thousand feet. I saw one pile of wood out on the Transcontinental containing 4,000 cords, where the largest stick was 4½ inches and from that it ran to 1½ inches, with the average size running under three inches.

In one section of the Pacific Coast where the United States Government estimate a stand of eighty-six billion feet, the highest authority in the timber cruising line, and one who knows more of that particular section than any other man, from actual cruises says the figure 8 wants to be dropped, as there is not over 6 billion at the most. Another example I have in mind is a certain territory which was estimated to contain 25 million cords of pulpwood and where, after operating seven or eight years, and cutting out only about 250 thousand cords, all the available wood was cut, and at a severe loss,



IN CANADA'S NO MAN'S LAND

Stripped of timber, and the soil burned off by recurring fires, this portion of [illegible] has been turned from a fine Provincial asset into a Public burden.

so that further operations of the property was abandoned.

I have in mind another limit that had been estimated to contain 16 cords to the acre, that was examined by a very competent cruiser, who found it ran nearer 16 acres to the cord, as he expressed it. I can cite several cases where the shrinking in estimates are just as striking as those above enumerated.

In connection with this phase of the subject, I cannot help thinking of the reply an old lumberman made when at one of the Canadian Forestry meetings in Montreal. The question of shortage in supply was being discussed, and one of the members suggested that we did not know what timber might be in the unexplored regions. The old lumberman replied that "in any section that the Canadian lumberman did not know what there was, there wasn't anything."

WHAT ABOUT THE STORE OF WOOD?

The great trouble with the paper mills in the past has been that the management have been devoting their whole thought and time to speeding up their paper machines, installing new and improved machinery, and improving their water powers, all of which is, of course, very desirable; but while they have been doing this they have lost sight of the most vital question, viz, a supply of raw material to keep these mills running.

The newspaper publishers are not without blame for the present shortage in newsprint, for every time they have fought a legitimate advance in price, they have made it more difficult and expensive for the mills to do business, especially under government control and regulation, and with regard to price it is not nearly as surprising that newsprint has advanced from 2 to 4 cents per pound and higher, than it is that eggs have advanced from 25 cents to $1.00 a dozen. A hen can be produced in a year, while these trees that are being made into paper have taken from 75 to 250 years to grow, and as they are becoming more and more remote from the mills, must necessarily become more costly to procure. Think even of the cost of toting supplies back into the woods, a distance of 70 miles, the cost of which in many instances amounts to from $50 to $60 per ton for haulage alone!"

Newspapers must accept the inevitable, as all other legitimate lines of business have done, and simply pass the cost along by increasing the price of their papers and their advertising rates. The newspaper has become a public necessity—no one will do without it to-day, and papers will sell just the same, whether the price is, 2, 3 or 5 cents per copy. And when the paper mills are forced to use some annual crop, as a substitute for trees in making paper (which is not far distant) paper instead of costing 4 cents per pound will cost 24 cents or more. So far as the American publishers are concerned, it is of course immaterial to them whether newsprint comes from Canada or the United States, so long as they are assured of a paper supply while the trees last.

When the public begin to realize that this timber, which is being cut to-day as if it were an annual crop, has been growing from 75 to 250 years, and the only way it can be reproduced is by re-planting, planting with the present high cost of labor amounts to a matter of $12 to $15 per acre, to which must be added the cost of the land, which is from $ 3to $10 per acre, something will be done. This brings the cost per acre of these plantations of tiny little seedlings from $15 to $25, with an annual charge for interest, taxes and fire protection for at least a matter of 50 to 75 years before another crop can be harvested.

In addition to this there is a possible loss from fire, and the spruce bud worm, and other enemies; for it must be borne in mind that fire is always with us, and the bud worm returns in cycles of from 20 to 35 years, and further, that each reocurrence, as the lands become harder cut, increases in violence.

INCREASE IN PRICE OF TIMBERLAND.

As soon as the above facts are absorved, as they are beginning to be quite rapidly at the present time, timberlands will be selling on a much higher scale than they are to-day, and my prediction is that the biggest rise in timberland values that has ever been known, will take place within three years.

There is not a commodity in the world that is selling so much below its real value as an acre of timberland to-day. Think of a crop that has been 50 to 250 years growing, and that under most favorable conditions will take from 50 to 75 years to reproduce with all the attendant risks, and an actual cost of $75.00 to $125.00, sellin gto-day at $10 to $15 per acre of land and all, while an annual crop of cereal or potatoes brings from $15 to $100 or even more per acre, above cost of planting and harvesting, and without the land.

THE REMEDY PROPOSED.

It is far better to look this question of a rapidly diminishing timber supply squarely in the face and try by practical methods to put off the day of reckoning as long as possible, and I advocate the following remedial measures:

An active campaign of education carried on by literature, and illustrated lectures, so as to reach all timberland owners and the public in general.

The creation of a strong public sentiment by various methods, so as to establish a greater appreciation of the value of forests to all, and a desire on the part of the public to help actively in preventing forest fires.

Improvement and enlargement of the present fire protective service.

Reforestation on a large scale by Governmental appropriation, regardless of cost.

Burning of slash under certain conditions and in certain cases.

Change the present wasteful method of logging by a closer supervision of woods operations by intelligent practical foresters.

An embargo or export duty on raw material taken from fee lands; or the

Annual purchase of fee land wood by a combination of all the Canadian mills.

I will personally subscribe ten thousand dollars to the Canadian Forestry Association, if each of the other pulp and paper mills in Canada wil lsubscribe a like amount, to be used in carrying out the work outlined above, under the direction of an executive committee to be appointed by the subscribers to the fund. This will give us a fund worthy of the name and will enable us to do some real work.

I am giving freely of my time and money towards an educational campaign along these lines, as I feel that it is the duty of every Canadian citizen to do everything in his or her power to safeguard, preserve and perpetuate our forest resources as they are the backbone of our country.

With rgard to reforestation, I am glad to note that the bud worm has not invaded this part of Nova Scotia owing largely to the fact that it is practically all spruce, the amount of fir being almost negligible, and probably also to the fact that the spruce is of such a sound, vigorous and rapid growth. I presume that the quality of the growth here is due to the fact that soil and climate conditions are ideal for spruce growing, the amount of precipitation being very great. Records at Halifax covering a period of 35 years show an average annual rainfall of 57 inches.

I have a sample section of red spruce tree in my office what shows a growth of 20 inches in 20 years, an inch a year in diameter. That is, of course, abnormal, but it is a fact that spruce makes the most rapid growth here of any section on this continent, which hints at possibilities in reforestation that are not applicable elsewhere. This phase is well worth the serious consideration and careful investigation of the Canadian Forestry Association.

In the old days when railroads were first built in Nova Scotia the timberlands were of little value and there was no such thing as fire protection, this province shared the fate of the rest of Canada and vast areas were destroyed by fire, but this is a thing of the past, as Nova Scotia has to-day one of the very best forest fire protective systems, and her citizens are thoroughly alive to the fact that timber is one of the most important assets.

LETTERS *to the* EDITOR

TREE PLANTING ON HIGHWAYS.

I am glad to see in the September number of the Canadian Forestry Journal that the Forestry Association is devoting some attention to the planting of trees along highways. Though this may not be the main object of the Association, nor have much connection with the growing of timber for commercial purposes or with conservation of rainfall, it is here that the spheres of forestry and road-planning meet.

It is of the utmost importance to the community that roads should be pleasant. As the country develops they will carry an ever-increasing traffic, and a pleasant road not only raises the value of the country through which it passes but is actually more effectual and traversed with less fatigue than a monotonous one.

The character of the planting must depend on the road allowance. Great continental highways should have a road allowance of 200 feet (or more at special points) and should in the main follow the contours of the land: and here the most effective way of disposing trees is by grouping them in plantations on the eminences or at curves or angles, or if the road is straight and level, at intervals of, say, 200 or 300 yards on the average. On second class highways trees might be planted in groups of four, and on ordinary highways in single rows.

At any rate the best results are obtained if highways are made to go to their destination by the easiest route and grade, irrespective of geometry and points of the compass, just as railways are.

Yours faithfully,

FRANCIS W. CAULFEILD.

London, England.

SIGNALLING IN THE FOREST.

To Canadian Forestry Journal,—The question of forest communication has not been given that careful consideration by the government that it rightfully deserves.

I have studied the question of forest communication very carefully, and consider that the communicatio n of a forest area is the basis upon which the successful fighting of forest fires rests.

The chief means of communication in forest areas to-day is by telephone, a costly and not altogether satisfactory method. This one means of communication requires constant supervision to keep it open, as one finds there is always danger of windfalls and fires breaking the line, and in the case of the latter the situation is certainly a serious one. The means of communication I would suggest for large forest areas during the summer are as follows:

(1) HELIOGRAPH.

Range up to 65 miles with a 5-inch mirror.

Weight complete with stand, 18 pounds.

This instrument could be carried by ranger over the roughest country, and communication established in a few minutes from high ground in the vicinity.

(2) LAMP ELECTRIC SIGNAL.

This type was used in the army and proved to be an exceptionally rapid and clear means of signalling.

Range up to 6 miles during day time and 15 to 20 miles at night.

Voltage 12.

Weight complete with stand 18 pounds.

Life of battery 80 hours of intermittent signalling.

Life of battery making ordinary signals from one month to six weeks.

PIGEONS.

Each ranger to carry say two pigeons (changed periodically) which have been trained to "home" to a central loft, preferably situated in or near a settlement.

The ranger would carry one or two birds with him during his trips. (Special baskets are made for the purpose of transporting homing pigeons, and can be carried on the back.) In the case of a fire one or both birds could be released according to the seriousness or otherwise of the fire, the released bird or birds carrying a message to the central loft giving the location, extent, etc., of the fire.

The ranger remains on the spot doing what he can to get the fire under control, instead of having to leave the scene to return for help, thereby losing very valuable time. Pigeons were found to be very reliable message carriers in France, and will give satisfactory results under all conditions, provided they are properly housed and trained.

WIRELESS.

This means of communication is rather more complicated than the others enumerated, and requires special training on the part of the operators.

In accessable regions small portable sets could be used to advantage, with a sending range of 20 miles and an unlimited receiving range. (The receiving range depends upon the wave length of the sending station.)

Small sets situated in the northern portion of Manitoba or Saskatchewan should be able to pick up signals sent by the wireless station at The Pas, but would not, of course, be able to transmit messages to this station.

The visual and carrier pigeon means of communication would undoubtedly give a far larger field of operation to the ranger, he would not be tied down to one particular place from which he could communicate to the outside.

There are many specially trained visual signallers in Canada to-day, who with additional training in forest ranger duties should become useful servants of the Crown. I hope your many readers may find something of interest in this letter. I may say that I instructed in all these means of signalling in France, and have great confidence in them.

Yours very truly,

G. R. SCOBY,

Late Instructor Canadian Corps Signal School in France.

c/o Domininn Bank, Winnipeg.

FORESTRY LEGISLATION IN CANADA DURING 1919

By F. W. H. Jacombe, Dominion Forestry Branch.

Below is given a resume of forestry legislation concerning Dominion and Provincial forest lands in 1919:

DOMINION OF CANADA.

Two Acts were passed to amend the Dominion Forest Reserves and Parks Act; one of these is general in nature, the other provides for the withdrawal of certain lands from the forest reserves. Under the former, authority was given to forest officers to seize the outfit and equipment of persons arrested for capturing or killing game or fish. Amendments were made to the Act further defining the power of the Order in Council to convey to the Province of British Columbia the surface rights in connection with mining claims in the Dominion forest reserves in British Columbia. Power is also given to expropriate lands for Dominion parks.

Under the latter Act, a total of about seven hundred and fifty square miles was withdrawn from the forest reserves. The chief withdrawals are in Manitoba (343.22) square miles, and in Saskatchewan (378.09) square miles.

By order in council of March 29, 1919, a considerable increase was made in ground rents, dues and fees for cutting timber on Dominion lands.

ONTARIO.

The Legislature passed the Popuar Pulpwood Export Act, giving authority to the Minister of Lands, Forests and Mines to authorize the export of poplar pulpwood in an unmanufactured state during such a period as should seem proper to him (suspending the operations of the "Manufacturing Clause").

QUEBEC.

In Quebec the law regarding the protection of the forests from fire has been amended by legislation compelling every license-holder to have his limits patrolled from May 1 to November 1, by rangers, paid by him, but appointed by the Minister of Lands and Mines, and devoting their whole time to the work, the number of rangers to be prescribed, when necessary, by the Minister. Monthly returns of fires, and of the number of fire-rangers employed are prescribed, returns of co-operative fire protection associations to be accepted for the members thereof. Offenders against this and other provisions of the fire-protective regulations may be tried summarily before a justice of the peace. Other legislation extends the provision of the existing law cancelling the sale, lease, etc., of land in case of fraud, etc., to sales, leases, etc., made prior to 1868.

NEW BRUNSWICK.

According to the new regulations which came into effect on August 1, 1918, the maximum height of stumps was fixed at sixteen inches from the ground. All trees to be taken from the woods up to the diameter of six inches at the top for balsam fir and spruce, and seven inches for pine.

All lumber left in the woods in contravention of the regulation to be charged for at $7.50 per M. The lopping of tops is again enjoined.

Permission was given to the licensee to cut and remove, under supervision of the forest engineer of the district, down or damaged lumber, irrespective of size. By subsequent amendment the licensee may also be called upon by the Minister to remove such timber.

By the new timber regulations which went into effect August 1, 1919, the stumpage on softwood (coniferous) and poplar logs was increased one dollar a thousand feet, board measure; a diameter limit of nine inches is placed on the cutting of jack ("princess") pine; all sound butted trees are to be sawn down "as low as possible, and never higher than sixteen inches from the ground, regardless of snow conditions"; and stumpage is reduced by one-third on all trees wholly killed by fire or killed by the spruce bud-worm.

ALBERTA.

Authority was given to the Public Utilities Commission to apply to the provincially chartered railways the regulations of the Dominion Board of Railway Commissioners.

BRITISH COLUMBIA.

The Forest Act was amended in several particulars. Lease-holders on renewing their licenses are placed under the same conditions and subjected to the same ground rents as the holders of special timber licenses.

Under certain conditions special timber licenses were made exchangeable for pulp licenses. Provisions were made to enable holders of mineral rights to exercise these rights where the lands so held were covered by timber lease or special timber licenses, in case of failure of the respective right-holders to come to any agree-

ment. Provisions were also made for the renewal up to Sept. 30, 1920, of licenses of which the right of renewal expired September 31, 1919. The close season for fires was extended from September 15 to October 1, the close season now extending from May 1 to October 1. Authority was also given the Department to require the disposal of slash where thought necessary, the costs to be borne half by the operator and half by the Forest Protection Fund; in case of neglect of the operator, the work to be done by the Crown and all the costs to be charged to the operator.

The Forest Relief Act was amended so as to exempt up to March 31, 1920, soldiers and sailors in the late war who held special timber licenses from penalties provided for neglect of renewing such licenses.

By the Aeroplane Spruce-Cutting Act, power was given to the Minister of Lands or anyone authorized by him to enter upon and occupy any lands in the province, to have the timber cut and disposed of in whatever manner and for whatever amount the Minister should determine. In such cases land may also be used for rights of way with or without the owner's consent. Compensation was granted for timber cut or land used as rights of way.

AN "INSURANCE POLICY" ON CANADA'S GREAT PAPER INDUSTRY

By George Chahoon, Jr., President, the Laurentide Co., Limited.



The Need of Scientific System in Operating Woodlands Emphasized by Noted Industrial Leader.



The present economic situation in Canada makes it imperative that our industries produce the greatest possible amount for export. Our war debt can only be paid and the adverse rate of exchange turned in our favor by exporting as much as we possibly can, preferably manufactured articles, so that our labor can profit by the increased value of raw materials made into finished products. No other industry is doing so much to swell our exports, nor is any other industry likely to do so much in the future, as the pulp and paper industry. Its exports have risen since 1914 from $22,120,934 to $82,092,776, an increase of 271 per cent, and there is no reason why this growth should not continue, if proper steps are taken to provide a permanent supply of raw material. Canada has large areas of spruce and balsam forests, which supply the best possible material, and abundant water powers for its cheap conversion, and may be said to be, to-day, in a more favorable position for the manufacture of pulp and paper and the new products which are based on them as raw materials than any other country in the world. According to the latest reports from the United States, the supplies of pulpwood are dwindling rapidly and will approach exhaustion in the next fifteen or twenty years. This is evidenced by the purchase of pulpwood lands by United States concerns in Canada and the construction of mills on this side of the line.

Unfortunately, our own supplies are by no means inexhaustible, and rapid inroads are being made on them. In the past, forest fires have taken an enormous toll of our forests and have destroyed more than has been used; but this menace, while not yet entirely overcome, has been enormously reduced, and with the building up of special protective forces of trained men will be still further reduced and will be held in reasonable bounds.

PROBLEMS MUST BE FACED.

We still have large areas, which though sparsely timbered, still have in the aggregate very large amounts of timber on them; but they are far from the mills. In the supply which is economically possible to use with the present means of transportation, there is quite a large amount of waste of low-grade material and also some loss in driving the wood the long distance necessary to reach the mills. These problems are being studied, and it is hoped that methods will be so improved that such wastes can be largely reduced.

The ideal situation for which all foresters are striving is that of a sustained yield; that is, that a region shall be lumbered that no more wood shall be removed in any one year than the amount which actually grows per annum. By such a system of management the forest becomes perpetually productive, and as long as it is not destroyed by fire, it will be an unfailing source of raw material. Under this system, mature trees may be cut over areas where the trees are of different ages and sizes, leaving th smaller trees to grow for a future crop, or a portion of the territory may be cut over entirely clean and a new crop obtained by natural seeding or by planting young trees which have been raised in a forest nursery.

All of these systems have been thoroughly tried out in Europe and are in use separately and in combination wherever forestry is practiced. Our Canadian forests have, in general, been handled under the first or selection system, not by any carefully thought-out plan, but by a fortunate chance. Unfortunately, the system has been carried out, not as in Europe, by taking the oldest and poorest trees and leaving the best and most vigorous for the future crop, but by taking out the best and largest trees and by leaving the feeble and decaying ones, or the young and stunted ones, which either never recovsr or take a very long time. Studies have shown that on the pulpwood lands of Quebec, under the present system of cutting, it will, in all probability, take sixty years to produce a crop and that the amount which can be cut at that time will be only one-quarter of the amount which is being cut to-day, an amount too small to make profitable logging possible.

ACCESSIBILITY IS THE TEST.

If a proper system of cutting should be adopted, the present cut per acre would, under the selective system, be reduced and logging expenses increased, but each year would see a larger possible cut, until the land had reached a maximum yield three or four times as large as that at present produced. If, on the other hand, we should begin to cut our lands clean, we should more than double the present yield, but we should have to wait for forty or sixty years for another crop, depending on whether we left the restocking to nature or replanted the forest ourselves. The crop at the end of the period would then be nearly eigh ttimes that at present obtained per acre. Any system will, for the immediate future, increase the price of pulpwood, but as the forest increases in yield the cost will drop progressively until the full yield is reached and will then remain practically stationary. The problem has to be faced, and the longer we wait before beginning a sane and practical policy, the more it will cost. Everyone in the country is vitally interested in this problem, and the cost should not be saddled entirely on the manufacturers of pulp and paper, but should be borne in great part by the provincial governments, which are the owners of the land. The price of wood is rising rapidly and will continue to rise until proper steps are taken to insure a permanent supply, and the cost will naturally fall on the consumer of the product. Newspaper publishers should be vitally interested in this question, as they are probably the largest consumers, and they should do their part by economizing in the use of paper and by educating the public and the voters, so that a sound policy can be adopted and the proper legislation passed to make it effective. All classes of the population are interested.

GOOD WORK BY COMPANIES.

The pulp and paper companies have foreseen the difficulties which confront them in the waning supply and the increased cost of logging and transportation, and have given much study to its solution. This great industry has organized and perfected a system of fire protection and has obtained from the government the enactment of better laws for the protection of the forests. It has proposed legislation for reforestation and is urging the government to pass it. It has spent money for experimental work, so that there would be a sound basis of facts on which to lay down rules for forest management and on which to base a wise forest policy. Experimental plantations have been made to determine the best species of plant and the proper soils on which to plant them.

The Laurentide Company, Limited, were the pioneers in this work, and have a large forest nursery, experimental plantations and cutting operations and are planting nearly two million trees the coming season and will rapidly increase the number.

The Riordon Pulp and Paper Company, Limited, are doing the same kind of work and have been planting for several years; 750,000 trees in the spring of 1919.

The Abitibi Power and Paper Company, Limited, and Price Bros. and Company, Limited, and the Spanish River Company, Limited, have the matter under consideration.

PUBLIC MANAGEMENT OF FORESTS.

This whole question of management of forests for a sustained yield and for the good of the country at large cannot, however, be left to private or corporation effort. Since the forests actually belong to the Dominion and Provincial governments, it is their plain duty to manage them properly. Then, too, the long term investment required, the length of time necessary to raise a crop of trees, the low rate of interest which must be charged against the principal invested, require that such work and management must be undertaken by the only certain long-lived agency capable of such work —the government. In all the provinces a large part of the general expenses of government are taken out of revenues, and in no instance is a reasonable or properly adequate sum being used in the upkeep and perpetuation of the property. Our legislators and administrators are beginning to realize the situation, and much progress has been made in the past five years. We are far ahead of the United States, but there is much need of further progress and in this work both the governments and the public can be assured of the broad-minded and public-spirited attitude of the pulp and paper industry and can be assured that it will co-operate in every way to develop a forest policy which will place Canada on a firm and solid basis as the greatest pulp and paper producing country in the world.

FUNDAMENTAL COMMONPLACES IN FORESTRY

By Dr. B. E. Fernow, Dean Emeritus of the Faculty of Forestry, University of Toronto.

1. Forestry—the growing of wood crops as a business—is based upon the presumption that wood will always be a necessary raw material in our civilization and that its present uses and methods of use will continue. It is a speculation, in futures. Perhaps we can learn in the future new uses for wood which will open up new resources not yet known. It may be possible, for instance, to grind up woods from the tropical forests and recompose them into new products.

2. Forestry as a business requires a small amount of labor, a large amount of capital and a long time for its products to mature. This last requirement distinguishes it from all other industries. It involves compound interest calculations—speculations for a long distant future. The time element alone means a speculation in compound interest.

LARGE AREAS ESSENTIAL.

3. Forestry as a business may be profitably carried on only on large sized areas which are capable of furnishing a sustained yield of sufficient amount annually. This applies especially where home markets are not developed. In the early days of my career I received a letter asking whether private forestry was possible and as to methods of carrying it out. This letter was signed "The Jabez Club." In answer, I stated that I believed I could carry it out if given 3,000,000 acres of southern pine and a working capital of $2,000,000. In reply this correspondent said that he had one-half the required acreage and asked for suggestions where he could get the balance. This letter was signed as was the first and I replied that before going further I must know the name of my correspondent. This letter had no reply. I was unable to find the Jabez Club in any dictionary. Jabez is a name mentioned once in the Bible, when he was the only gentleman present.

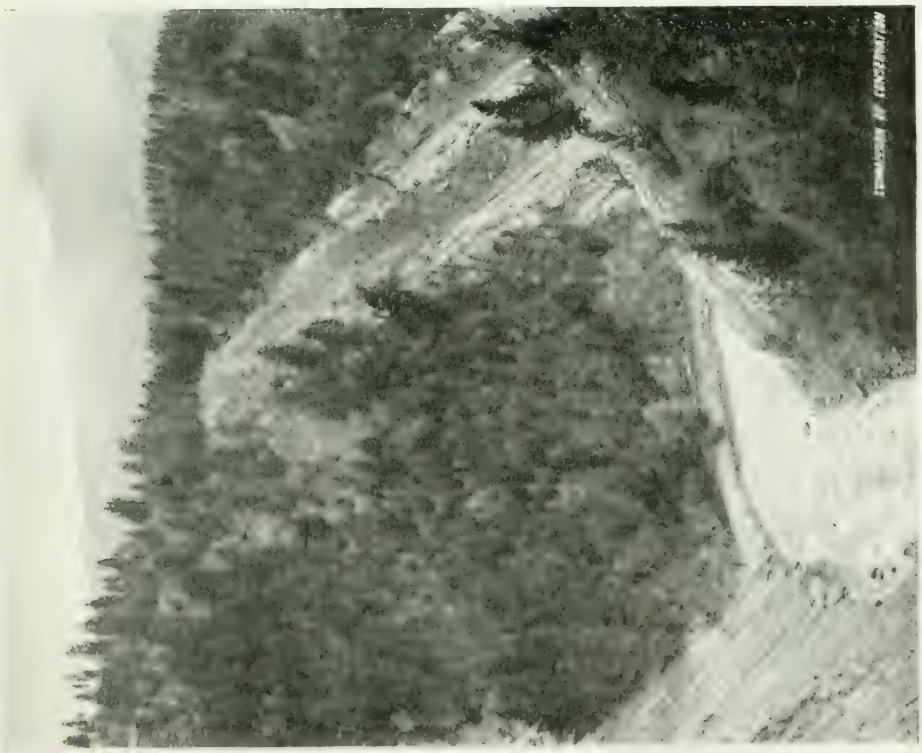
4. Proper economic considerations demand that agriculturally fit soils be reserved for food production, leaving the poorer sites for forestry use. This condition reflects disadvantageously upon the unit area production, and upon all the financial aspects of the business. For this reason the great yields of agricultural lands can not be expected as an average from forest land.

5. Financially, forestry means foregoing present revenue or making present expenditure for the sake of future revenue. Forestry is profitable only in the long run; and the long run on so-called forest soils as a rule means 50 to 150 years.

6. These fundamental conditions of forest-growing render it unattractive to private enter-



Columbia River, above Revelstoke, B.C. The river here is navigable by steamer.



Typical steep, rocky, rushing mountain tributary to upper Columbia river. A portion of Toby Creek.

prise, which looks for immediate or nearby results. Only large, long-lived corporations may be an exception and industries like paper manufacturies, with heavy investments in operating plants, relying on a continuous supply of raw material. Their position is peculiar, and not to be confused with most lumber companies.

7. The interest in forestry of the community, municipality, and state is three-fold; namely in the assurance of continuous supplies for wood using industries, in the influence of the forest cover on water conditions, in the utilization of all land areas to the best advantage.

8. This communal interest establishes the right of the community to control the handling of private forest property at least to the extent of protecing itself against damage in the three directions of preventing its abuse and the turning of productive into waste lands, possibly also enforcing silvicultural methods. This gives the state the right to interfere; whether the federal, state, or municipal government is the most ,practical influence is not predicated.

9. Silviculture—the art and operation of securing reproduction of wood crops, is based largely on empiricism, and its methods vary according to local conditions and judgment. No two foresters may agree on procedure in a given case ,and yet both may be successful. It is therefore impracticable to prescribe procedure with assurance; it is also difficult to inspect and control procedure.

10. Silvicultural success depends upon the combined effects of species, soil, climate, weather and size of operation. While financial considerations favor large continguous felling areas and rapid explaitation ,silvicultural considerations necessitate small, disconnected felling areas, and, if natural regeneration is to be relied upon, slow removal of the mature crop; hence accessibility to every part of the forest property, involving large capital outlay, is a silvicultural necessity. Woodlot forestry is different from that practiced on large areas. If one wants to apply forestry it must be on large areas, say one of 30,000 acres, and the owner must be able to cut anywhere so as to take advantage of changing conditions.

WHICH REGENERATION?

11. Natural regeneration while ,apparently cheaper than artificial reforestation because not requiring visible outlay, entails slow, i.e., expensive ,removal, waiting for seed years and luck in weather, while artificial regeneration can be forced to success but requires definite capital outlay. Success by natural regeneration is largely a matter of luck; for if all elements are favorable you may get results. If any one of these conditions fails, then it is necessary to apply art at once, through artificial means.

12. All points considered, forestry as a business can be successfully applied only or mainly by the community, municipality, or state.

The problem here involves the prevention of nuisance on private lands, or the conversion of timberland into waste land, through improper handling by the private operator. The private individual can not be expected to engage in business which will show results only in the lifetime of a man, and he will not figure on returns for his children or his children's children.

ALBERTA'S LOSSES $2,250,000 FOREST RESERVE FIRES

Calgary—Fire losses on the forest reserves in Alberta during 1919 aggregated more than $2,250,000, or greater than the estimated loss of the previous ten years. The loss in 1918 was approximately $1,000. These figures were issued by the Forest Reserves Inspectorate. Fires swept over 548,000 acres of forest reserve in 1919, while 20,000 acres were burned over in 1918, which was chiefly open land.

AMERICA'S BIG JOB AHEAD

Filbert Roth, Professor of Forestry, University of Michigan, in the American Lumberman (Condensed).

To Secure Timber it Will be Necessary to Start at Once a National Forest Policy

Forty years ago the "experts" tod us two big stories: That there was an inexhaustible supply and that substitutes would rapidly replace wood. Both stories were wrong. The truth, well recognized now, is that we have about 2,500,000,000,000 feet of standing timber. The big woods decay as fast as they grow; that is ,they make no net growth for us to figure on. The annual cut of timber has been hovering around the 40,000,000,000 mark for about thirty years. We now use, and have used all these years, over half of all the lumber cut and used in the world. The per capita use of about 400 feet of lumber increased up to about 1908, and has dropped slowly since.

THE TIMBER NEEDED.

Even if we can keep up a cut of 30,000,000,000 feet a year the expected population of 200,000,000 in fifty years will have 150 feet b.m. per capita to use. This is about the rate of consumption of timber in Germany and a little more than that of Great Britain, France and other industrial countries, and represents the approximate minimum which any progressive people can get on with. And when that day comes, the people of the United States will pay higher prices for timber than have ever been paid by any people anywhere; for they are used to wood and they have the money. We may even bring in billions of feet of timber from Europe.

The substitutes have done little more than help us to find new uses, and the war has driven this bugaboo out of the brush. The present supplies will hold out sixty years, and by that time we shall need 200,000,000 acres of real forest ,producing in actual yearly growth 150 feet of saw timber an acre; three-fourths conifers, the oldest big enough to use, and ready to cut.

"But we can bring timber from Siberia and Singapore," say some. This is nonsense, and thinking people are tired of being fooled.

So, then, the problem is here, real and big. It awaits solution and not mere talk. It is simple but calls for work and money and above all for common sense, good will and persistence.

FORESTRY IS A BUSINESS.

Forestry is business, and means putting woods in such shape that a crop can be cut every year. And whether this woods is 100 or 10,000 acres the forester tries to get it into such condition that he can harvest in any one year about as much as grows during that year.

To illustrate a real forest by an actual case:

Area: 8,000 acres (round figures).

Timber: spruce, with some beech.

Improvements: roads, open lines for roads and for protection, dividing tract into small fields of from 10 to 40 acres; also houses for forester and his helpers.

Method of silviculture: cut old stands clean (about 80 acres each year); replant next spring; thin the timber on every acre once every ten years; in any one year, then, about 800 acres.

Age: when ripe timber is cut, about 100 years.

Harvested in 1908: 630,000 cubic feet of ripe timber from 80 acres; 340,000 cubic feet from thinnings. Total, 970,000 cubic feet of wood.

Cash income, gross: over $80,000 a year.

Net income: over $50,000 a year.

Pays out in expenses, chiefly labor, about $30,000 a year.

The boss is a college bred man; he has maps and books, and every ten years his whole tract is inspected, re-estimated (new inventory), and a new plan made for it. His helpers are in the forest every day, rain or shine.

This is forestry, and it works and has worked for several centuries. It pays; it has taken land worth, say, $20 an acre and made a property worth over $200 an acre. It yields taxes higher than do most of our farms.

FORESTRY AND FARMING.

But central Europe has proved by centuries of success that forestry works; that it beats the farm in relative effectiveness. The farm in

Europe and America is not over 50 per cent effective; that is, the average crop is not over 50 per cent of the full or perfect crop; but forestry in Wurtemburg is better than 70 per cent effective to-day and is improving. The state forests of Wurtemberg and Saxony, over a million acres, have for years past made better than $5 net an acre a year and have paid higher taxes than the farm.

What these forests do for shop and factory, for climate and water flow, for transportation railway and highway—would easily be worth $10 an acre a year. And this "secondary benefit" the state gets, but a private owner does not, and here again lies a peculiarity of the forest as a crop. That the forest can use poorer land, cold and frosty sites, wet ground; that it keeps up and even improves the soil; that timber in the lumber yards does not spoil like potatoes, but seasons and improves; that it is bulky and costs money to haul, all these things are too well known to need mention. To some of our railroad people it might be of interest to know that the forest beats the farm easily four to one in freight requirements.

AMERICA HAS ADVANCED.

Forestry is an old business in Europe, it is new with us. And yet, thanks to Fernow, Pinchot, Roosevelt and others, much has already been accomplished. Forty years ago the word "forestry" was not in the American dictionary; there was no forester in the United States with an acre of land to work or a log to sell; we knew little about our forest trees or our forests.

To-day the United States forester has jurisdiction over an area of forests more than four times that of all the forests of the former German Empire. He offers for sale timber by the hundreds of million feet. He has built thousands of miles of roads and trails and telephone lines, and has developed the best protective system to be found anywhere in the world, when we take into consideration the meager means allowed by Congress.

The forests of the United States are now well known as to location, area, kinds of trees and condition. The foresters of the United States have more real forest studies and experiments under way than France ever attempted and we shall soon be in shape to tell a man what he can do and what he can expect with any of over thirty kinds of timber on different soils and sites, north, south, east or west.

But what is more important than all this is the fact that the people of the United States are informed, that their mind is set on forestry, that the legislatures of most of our timbered states have taken hold of this problem and that forestry as a definite policy in Congress has come to stay.

Forestry is here, it has progressed, and progresses now faster than ever. The great national forests have proved their worth; the states have made beginnings; we are now ready to attempt the hardest and the most important task, that of getting forestry not merely started but going in all of our most important forests—those in private ownership, the forests from which comes over 80 per cent of our lumber cut to-day. Until we have succeeded in putting forestry there we cannot claim really to have it in this country; and is no real assurance of our future supplies and the safety of our industries and welfare.

THE JOB AHEAD.

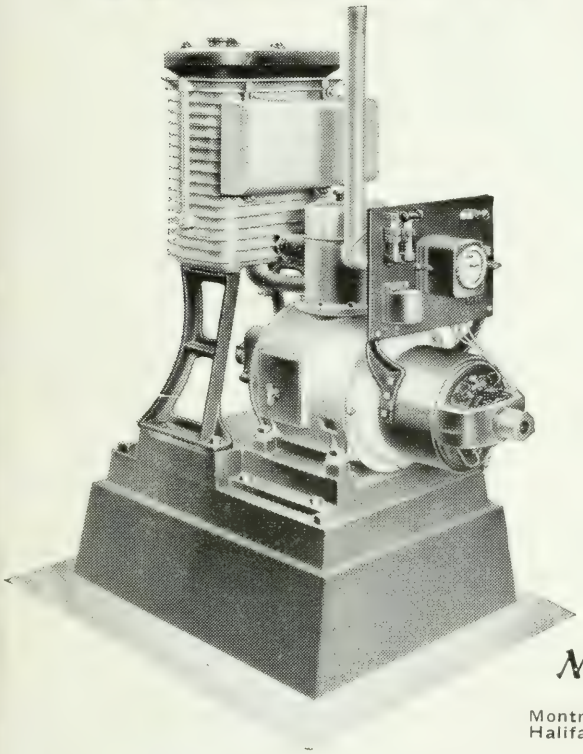
The job ahead is to prepare for a "growing stock" of timber large enough to supply our people with a yearly cut of at least 40,000,000,000 feet or 200 feet b.m. of lumber per capita for a population of 200,000,000, and do this in about 60 or at most 100 years. According to Endres, the German forests in 1900 furnished a cut of about 700 million cubic feet of timber. Allowing as they do for one-third waste, this means about 5.6 billion feet b.m. saw stuff. This was grown on about 35 million acres of woods, so that the yearly growth and cut of saw stuff averaged about 160 feet b.m. an acre.

On this basis we would need 250,000,000 acres of productive forests growing 160 feet b.m. an acre a year, or about 200 million acres outside of the present national forests. We shall need more, for it takes time to learn the business to start real timber crops and avoid large losses.

The task is here; it looms clear and is well recognized. Interested and thinking men in many walks of life are earnestly discussing the subject. Forty years ago when Fernow started our people in a campaign for real forestry the general application of forestry was out of the question. He knew this. To-day we are ready for it and need it. We can see that without the help of bulletins. Cypress plank in Michigan at $130 a thousand feet; Pacific coast lumber in Ohio and the east; dozens of sawmill towns in desolate ruins; miles of railways abandoned; the lumbermen's statement "the big mills of the

Northern Electric

POWER AND LIGHT



Electric Plants for Every Service
350 to 5,000 watts.

Especially adapted to camps—saw-mills—construction work—stores—farms and all country houses.

This cut shows the Utility model ¾ K.W. usually furnished wtih storage battery, but obtainable as a one-piece generating unit.

Its features include: Bosch Magneto—S.K.F. Ball Bearings—Electric Governor—and concealed Flywheel—it is self-cranking and stops itself when battery is charged.

Northern Electric Company
LIMITED

Montreal
Halifax
Toronto
London
Regina
Calgary
Edmonton
Vancouver
Winnipeg

Foresters' Equipment

MOSQUITO AND INSECT PROOF TENTS
WATER AND MILDEW PROOF BAGS
FROST PROOF SLEEPING BAGS

ALL "WOODS" QUALITY

Woods Manufacturing Co.

DEPT. D. OTTAWA

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST

DRYDEN, ONT.

Shippers to H.M. Government.

Hill's Seedlings & Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.

Forest Planters Guide Free.

The D. HILL NURSERY CO. Evergreen Specialists

Largest Growers in America.

Box 503. DUNDEE, Ill., U.S.A.

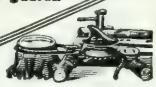
Try This Stump Puller at Our Risk

The 8m' Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address

W. Smith Grubber Co.

11 Smith Sta.

LaCrescent, Minn.



ASK EVERYWHERE Eddy's IN CANADA **FOR**



GAGNON & MORISSETTE

TIMBERLAND CRUISERS

LUMBER CONTRACTORS

FOREST INDUSTRIES

CHICOUTIMI, - - P.Q.

LT.-COL. L. J. D. MARQUIS

Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.; Former Mem. Que. F. Service

Timber Factors and Logging Costs

Facts on Forest Growth and Future Products

Forest Cruising and Mapping

GIFFARD, - - - QUEBEC.

Timber Lands Bought & Sold

Timber and Pulp Wood Estimates.

R. R. BRADLEY

CONSULTING FORESTER

Globe-Atlantic Bldg. - ST. JOHN. N.B.

Timber Estimating & Mapping

Management of Forest Properties.

Supervision of Lumbering Operations.

Forest Planting.

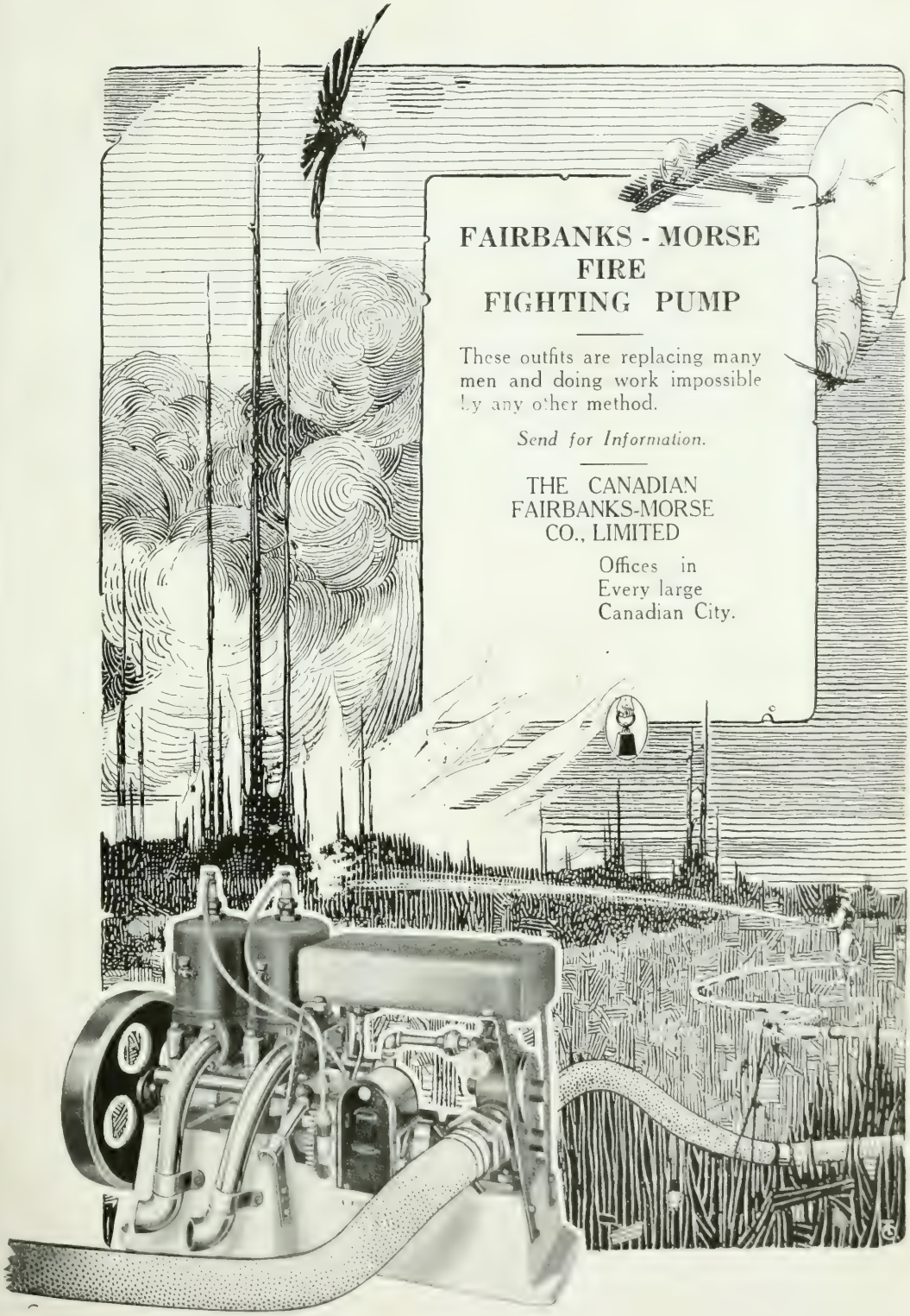
COOLIDGE & CARLISLE

FOREST ENGINEERS

BANGOR - - - - - MAINE.

Timber Estimates

JAMES W. SEWALL Old Town, Maine.


FAIRBANKS - MORSE
FIRE
FIGHTING PUMP
These outfits are replacing many men and doing work impossible by any other method.
Send for Information.
THE CANADIAN
FAIRBANKS-MORSE
CO., LIMITED
Offices in
Every large
Canadian City.

HIBBERSON BROS.
FOREST ENGINEERS and SURVEYORS

Cruising, Mapping, Logging Costs, Flumes, Rogging R.Rs.

Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.

Fifteen years experience cruising British Columbia Timber.

Suite 701-5 Belmont House, Victoria, B.C.

LUMBERMEN ATTENTION!

Investigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for booming swift running rivers where logs are held.



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

A. E. LOOSEN,
BATHURST, NEW BRUNSWICK



QUEEN'S
UNIVERSITY
KINGSTON,
ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August.
NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.

FORESTER WANTED
for
NEW ZEALAND

A Chief Inspector of Forestry is required by the New Zealand Government. Salary £600 per annum, increasing to £700. Candidates should be graduates of a School of Forestry of recognized standing. Full particulars and forms of application obtainable from the High Commissioner for New Zealand, 415, Strand, London, by whom complete applications will be received up to the 20th January, 1920.

south will be cut out within ten years;" these are our present day instructors and they speak a language which convinces everyone.

THREE ESSENTIAL FACTORS.

What is there to do? Where must we begin? What is the plan? As in so many things, there are several roads to Rome. No one man knows it all, or even knows very much of it; and no one's opinion and plan, therefore, should be set up as infallible. This task is too big to hurry or "railroad" through; if a good beginning is made in five years we may feel satisfied.

In its fundamentals forestry is very simple; to introduce it under the great variety of conditions, from Maine to California, from Minnesota to Louisiana, is quite another story.

All will agree that a plan for the general application of forestry in the United States must have three qualities to be useful: It must be just, acceptable and practicable.

Justice to the people means that plenty of lumber shall be supplied regularly and at a fair price (not cheap, but fair); that the future shall be safeguarded by keeping a sufficient area of forest in a productive condition, and that the forests are well distributed over the country to avoid the great burden of long distance transportation.

Justice to the timber owner means that all shall fare alike. A plan which forces the man in Georgia to mark and cut by the selective method because this seems to work out in Maine is not a just plan. The man in Georgia may practice better forestry by cutting his land clean and planting and seeding it. A plan which allows one man to neglect his slash and compels another to clean up is not fair; nor is one which gives good fire protection at one place and poor protection at another.

That the plan must be acceptable is evident to all. As soon as the leading men in the Government of the nation and the states can get together with the owners of the forests on a just and workable agreement the matter becomes simple and easy.

PLEASE SEND IN YOUR MEMBERSHIP FEE PROMPTLY.

THE MEMBERS ARE RESPONDING SPLENDIDLY TO OUR NEW PLAN OF A TWO-DOLLAR ANNUAL FEE, INCLUDING SUBSCRIPTION TO THE FORESTRY JOURNAL.

WANTED

LIGHT RAILS

State whether complete with splice or angle bars. Give size, quantity, location, condition and best cash price f. o. b. cars loading point.

Box No. B, Canadian Forestry Journal, Ottawa, Can.

B. M McGRATH

Colonial and Industrial Investments, Timber, Pulp Wood Areas and Waterpowers.

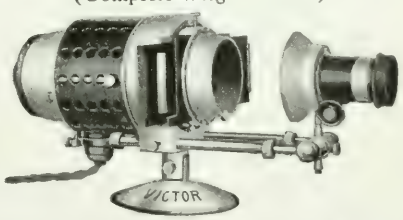
Newfoundland and Labrador Mines and Minerals.

Reports, Plans and Estimates Furnished

TRADE REVIEW BUILDING, ST. JOHN'S, NEWFOUNDLAND

Victor Portable Stereopticon

(Complete weight 11 lbs.)



THE "VICTOR will use 3¼ x 4, or 3¼ x 3¼ Lantern Slides. Price $65.00. When required for educational or religious work, price $50.00.

Can be used with any electric current, or supplied for use with Acetylene and Prestolite Tanks.

Write for Complete Catalog.

SUPPLIES COMPANY OF CANADA LIMITED

65 SPARKS STREET, OTTAWA, ONT.

ALBERTA'S ANSWER IS EASILY GIVEN

(Editorial in Edmonton Journal, Saturday, October 25, 1919.)

AN ALARMING STATE OF THINGS.

Mr. Robson Black's statement regarding the loss of Alberta's forest wealth and its consequences is startling. The actual destruction of timber is a serious matter, but it is its effect on the arable areas of the province which is now mainly concerning forestry officials. Those portions of southern Alberta which are dependent on irrigation have reason to be specially concerned.

It should not be necessary at this date to explain how essential to an abundant and uniform flow of water in our rivers is the preservation of the forests in the mountain regions where these rivers take their rise. It was in recognition of this that some years ago the whole eastern slope of the Rockies was set aside as a forest reserve. But fire, it seems, has been largely nullifying this action.

Measures to cope with this evil have been initiated and carried through with much difficulty owing to the failure of the province to co-operate as it should with the federal authorities.

The Dominion now spends $700,000 a year for the protection of forests, but derives no direct benefit from these nor from the irrigation schemes which are dependent upon forest preservation. Considering all that Alberta has at stake in the matter, and considering that the provincial government is not called upon to meet any of the actual outlay entailed by the efforts of the forestry officials, it should, at least, help where its help is essential to the securing of results. Legislation has been withheld which would allow Dominion fire rangers to make criminal charges against homesteaders and others who cause fires through wilful carelessness. Most fires arise in this way and, as prosecutions are impossible, the fires continue to be a menace. They have been especially destructive during 1919.

THE UNIVERSITY OF TORONTO

and

UNIVERSITY COLLEGE

WITH WHICH ARE AFFILIATED

ST. MICHAEL'S, TRINITY & VICTORIA COLLEGES

Faculties of

ARTS MUSIC MEDICINE

EDUCATION APPLIED SCIENCE FORESTRY

Departments of

HOUSEHOLD SCIENCE SOCIAL SERVICE

For information, apply to the Registrar of the University, or to the Secretaries of the respective Faculties.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING.

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

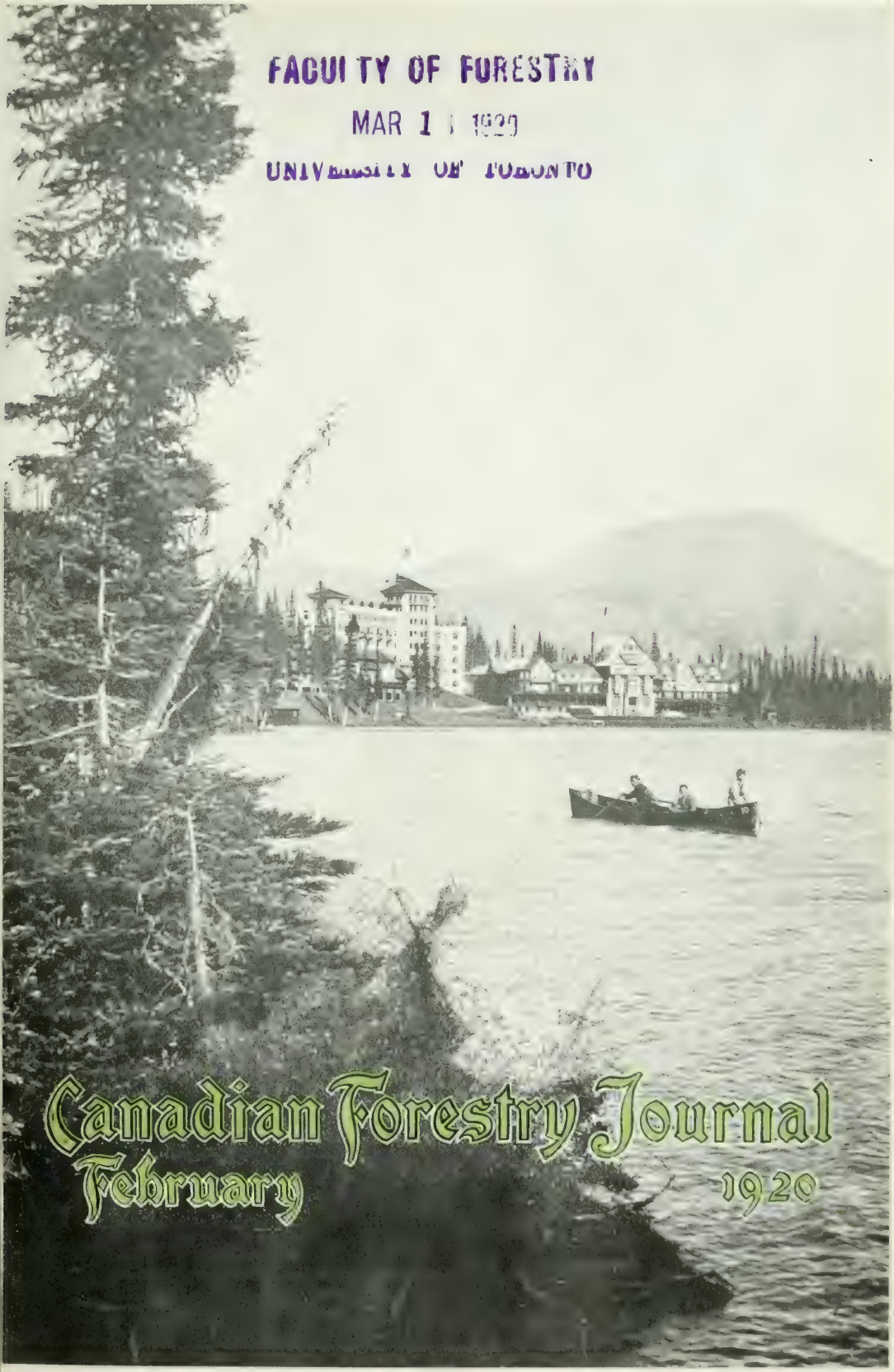
Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities Corporation Limited

MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG.

FACULTY OF FORESTRY
MAR 1 1929
UNIVERSITY OF TORONTO



Canadian Forestry Journal

February 1920

ON BEAUTIFUL LAKE LOUISE, ALBERTA.



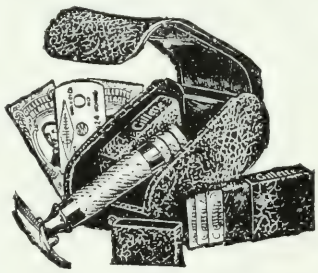
Field, Stream and Road

How strange the old-time pictures of sport would look today—baseball teams boasting at least half-a-dozen sets of whiskers—full-bearded cricketers—champions of the scull with their chins concealed.

Today the athlete knows the importance of the well-shaven chin. He is conscious that he is most keen when he is well-groomed—just as is the business man and the soldier.

For men who love outdoor life and sports, men of virile minds and active bodies, we have designed a Gillette Safety Razor with an extra stocky handle—the "Bulldog" Gillette, shown to the left.

Not that the Gillette needs a sturdy grasp. A light touch, with the angle stroke, removes the most stubborn beard with surprising comfort.



The "BULLDOG" Set includes oval Morocco Case with two blade boxes to match, and 12 double-edged blades.

But there is a certain appeal in the thicker handle of the "Bulldog". Ask to see this special set and appreciate the point for yourself.

The case, you will notice, is almost as compact as the famous Pocket Edition Gillettes, and the price is the same, $5.00.

Sold by all dealers catering to men's needs.

MADE IN CANADA

TRADE Gillette MARK

KNOWN THE WORLD OVER

Gillette

Safety Razor

573

CULATION: 11,500 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Journal

VOL. XVI. OTTAWA, CANADA, FEBRUARY, 1920 No. 2.

SWEDEN'S SCHEME FOR GROWING FORESTS

By H. Claughton Wallin, Chief of Surveys, Dominion Forestry Branch, Fomerly in Swedish Private Forest Service.



Every Operator Judged by the Amount of Reproduction That Follows His Cuttings.



The total area of Sweden is 172,963 square miles, about half the size of Quebec.

More than half of Sweden is retained permanently for growing forest crops.

There are 23 Boards of Conservation Commissions, employing 33 foresters (graduates of the Royal Forest Institute), 210 permanent rangers and inspectors (who have completed a one-year course), and 861 overseers and "planters." These men have supervision of 41 million acres of privately-owned forests.

In addition to the foregoing staff on private lands, the State Forest Service in 1913 (the last figures available) employed 10 District Chief Foresters, 3 State Forest Engineers, 97 Forest Superintendents, and 155 Forest Assistants who were all technically trained foresters. The staff has since been considerably increased and would now amount to over 300 technical men. The number of rangers and assistant rangers, who must be graduates of a school of forestry (twelve months course) is between seven and eight hundred.

The State Forest Service has authority over 22,000,000 acres of state-owned lands, of which 12,500,000 acres are in Forest Reserves proper.

In 1918, the Forestry Boards restocked 70,000 acres by artificial seeding or planting.

About 71 million trees, mostly Scotch pine and spruce, and about 50,000 lbs. of pine and spruce seed were distributed. Two-thirds was supplied free or at a price less than cost. About 11,000 land owners received these supplies.

This does not include the extensive planting and seeding work done by the large estates and lumber companies which often have their own nurseries and, as a rule, their own foresters to direct the work.

One achievement of the Forestry Boards in 1918 was to drain bogs and swamps by constructing over 100 mlies of ditches.

Sweden's definition of proper forest management may be summed up as follows:

Any lumberman or other forest owner may cut by whatever method he pleases. He may cut the land clean or leave seed trees. But—and here we encounter the secret of Sweden's remarkable success In growing new forests—the cut-over areas must show after a reasonable time such abundant reproduction of young trees as will satisfy the rigorous examination of a Board of Foresters. In other words, Sweden says to the operator: "We are concerned in keeping the lands permanently under forest. We judge you by the state of your lands following cutting. If you cut clean you must replant at once. If you follow the selection method, leaving mother trees for seeding purposes, you must satisfy our examining officers that your lands are actually restocking in a way to develop a heavy forest growth in the futre."

Practically the whole of Sweden's private forests are "managed" by Boards of Conservation Commissioners, acting through trained foresters. The public responsibility for maintenance of the country's forest wealth has long been accepted and whether the operator owns his lands outright or, as is mostly the case in Canada, lease them from the state, the insistence upon scientific cutting and restocking is resolutely carried out by the public administration.

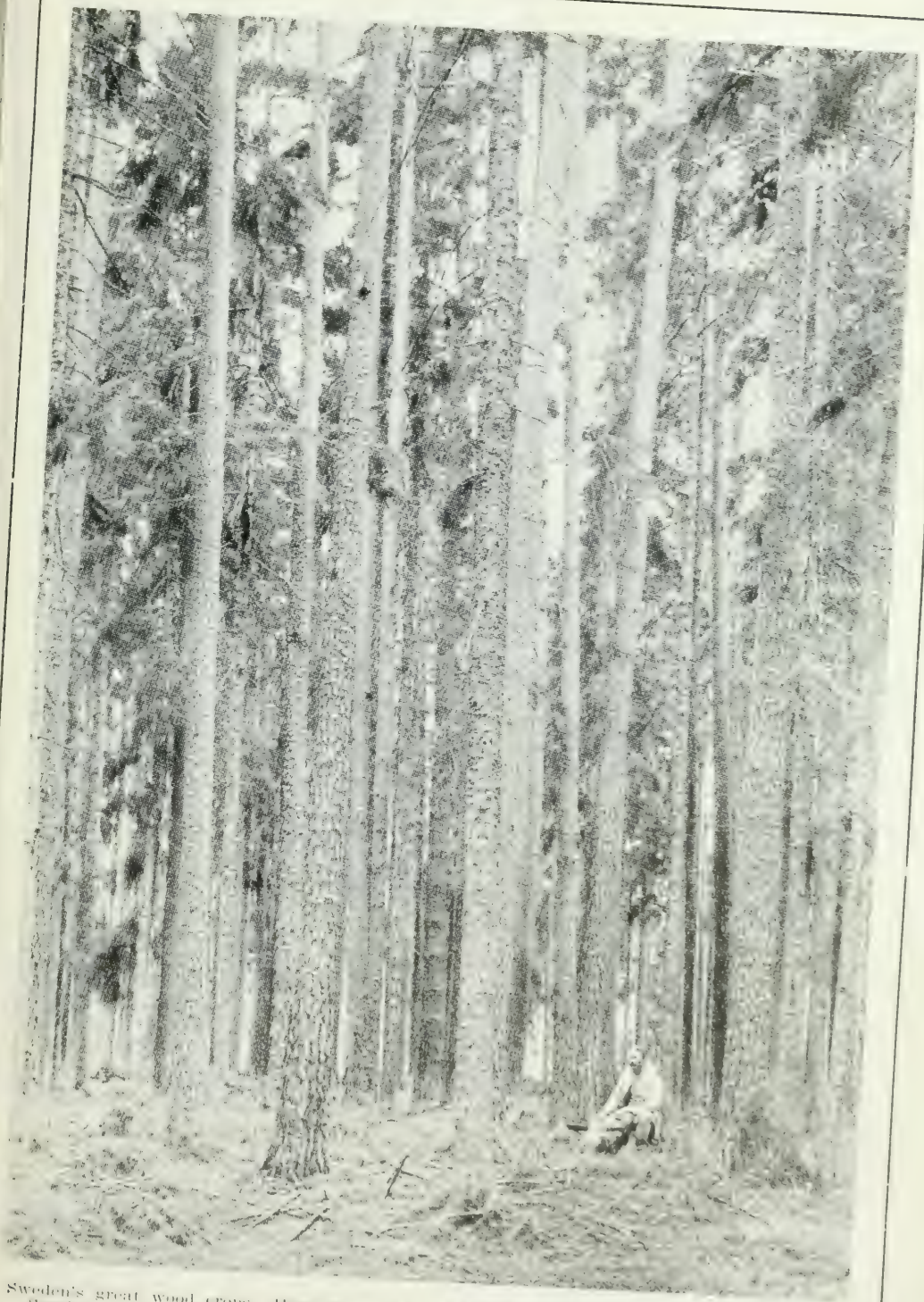
Sweden and Norway and Finland of all European countries, should be studied by Canadians interested in forest methods. Conditions are more closely analogous to those of Canada than is the case with France, Germany or Switzerland. French forest methods are discounted in Canadian eyes by the great disparity between important economic onditions in the two countries. Sweden, however, is not materially unlike Canada in the various considerations that would make comparison of forest methods suggestive and helpful.

Following are the most important clauses of the Swedist forest law and a few words about its execution:

On private woodlands cutting and the management of the land after cutting shall be carried on in a manner that will not obviously jeopardize reforestation.

If neglect is proved, owner is held responsible and is compelled to take such measures as are necessary to secure the establishmnt of a new stand.

A Board of Conservation Commissioners shall be elected for each county revenue district and together with the foresters appointed by them and the forestry commtitees for the parishes they shall exercise control.



Sweden's great wood crops. Here is a stand of Norway Spruce and Scotch Pine in Central Sweden. It is of an even age, having followed a fire set by farmers 110 years ago.



Forests that are making Sweden's fortune. A stand of spruce 70 years old with forest officer in uniform.

If it is found that woodlands are not given necessary care, the Board of Commissioners shall call for a government investigation. An officer of the state forest service is then instructed to examine the land in question and to report to the board, suggesting such measures as he may deem necessary for the establishment of proper forest cover.

After consideration and approval of the government forester's suggestion the board shall make an agreement with the owner of the neglected or mismanaged land, the owner agreeing to carry out the written instructions of the board.

If the two parties cannot come to an understanding or the owner fails to carry out the instructions of the agreement, the board shall prosecute the party concerned in court.



Here we find a Swedish forest of spruce and Scotch Pine, worked on forestry principles. It is 40 years old and has been thinned once.

The court then orders what steps should be taken in the case necessary for the securing of forest cover on the land in question and also fixes a time in which the work shall be done at the risk of the board carrying out the orders of the court at the expense of the defendant.

The court may also prohibit a further cutting on the whole or on a part of the defendant's property until the orders of the court are carried out, unless the defendant provides security for the fulfilment of the order.

If contrary to the decision of the court cutting is done the guilty party is sentenced to a fine, the timber being forfeited to the crown.

If the defendant does not possess funds for the paying of the fine, he may be sentenced to a corresponding time in prison.

This law does not prevent the owner of woodland from clearing any part of his land for cultivation, pasture or the erection of buildings.

Besides having to exercise control as mentioned above it is the duty of the Forestry Boards—

To encourage silviculture by spreading knowledge of forest management;

To give pecuniary help for silvicultural work, and if necessary perform the work;

To furnish owners of woodlands with seeds and plants—free, or at reasonable prices;

To furnish advice in the handling of woodlands; in short

To encourage as much as possible the practice of intensive forestry on private forests and woodlots.

It is also the duty of the board to administer the revenue received in each county revenue district from the export duty on timber, lumber, cordwood, pulp and pulpwood.

Other sources of income are yearly grants from the state and the provincial governments and also to a certain degree the sale of seed and plants.

Seed and plants as well as assistance in the work are only furnished free when the applicants are in poor circumstances.

ASSOCIATION AND ONTARIO'S FOREST POLICY

"Resolved that the Canadian Forestry Association desires to place itself on record as heartily approving of the expressed intentions of the Government of Ontario to bring the Department of Lands and Forests of that Province up to the highest possible state of efficiency."

Passed at a meeting of the Directors held at Ottawa, February 17th, 1920.





WHAT FOUR YEARS CAN DO ON THE PRAIRIE.

The upper picture shows a Scotch Pine plantation made by Mr. Norman Ross on the Spruce Woods Forest Reserve, Manitoba. The first photograph was taken in 1915, the lower one in 1919, showing remarkable growth in the four years.

HAVE YOU A WOODLOT GOING TO WASTE?

By B. R. Morton, B.Sc.

About that undeveloped woodlot or woodland on your place? Mr. B. R. Morton, B.Sc.F., of the Dominion Forestry Branch, will take up with you in this and future issues of the Forestry Journal the question of making a maximum profit from it. The following is introductory:

It is frequently said that the farm woodlot in Eastern Canada needs no attention because trees will grow without care. True, trees will grow with little or no care. So will an orchard or a field of potatoes grow without care. But if we are looking for the best returns from our orchard or potatoes, we must give them attention. Just so with the woodlot, we must look after it if we desire the best results. A woodlot well established and in good condition requires very little attention, but this little attention pays well.

Perhaps the greatest objection made to caring for the woodlot is the time it takes to produce large sized timber. On the farm, however, there are many uses for the small and medium sized forest products that take a comparatively short time to produce. On many woodlots a thrifty young growth already exists, and it will not require many years before this is sufficiently large to use. A little attention will shorten considerably the time required to produce marketable material.

The demand for small dimension materials is steadily increasing because the scarcity of wood in large dimension is forcing the manufacturers to use built-up wood. The war has done much to increase our knowledge regarding the possibilities in the use of "laminated" products, of which the airplane is an example. This use of wood in small sizes makes it possible to market the products of the woodlot, while the trees are comparatively young.

There are many reasons why it is good business to maintain a woodlot on the farm. Without it, it becomes necessary to purchase the fuel, posts and other wood material required about the place. Few farms are so small that it would not pay to maintain a small part under trees. The woodlot gives the farm as a whole a higher value. Even when it has been started artificially by planting and the trees have not yet reached merchantable size, they have value. Planting a woodlot is a sure and safe way of building up a bank account for one's old age or one's children.

On many farms there are one or more waste areas, patches that are not suited to agricultural crops. The soil on them is sandy or perhaps the surface is too rough, stoney or steep to allow it being cultivated. Why allow these waste areas to remain idle generation after generation when with a little initial cost they can be made to grow trees that will be increasing in value as you sleep. Each piece of ground should be used for the purpose for which it is best suited—a poor piece of soil should not be abandoned merely because it will not yield so large returns as the remainder. There is no part of the farm so poor that it will not produce tree-growth.

THE FOREST IS THE PROP OF THESE INVESTMENTS.

A preliminary report on the pulp and paper industry in Canada has been compiled by the Dominion Bureau of Statistics for the calendar year 1918. The statistics are presented for each class by number of mills as follows: Pulp mills 37, paper mills 31, pulp and paper mills 26, or a total of 94 mills.

The total capital invested in the industry was $241,344,704, of which $12,520,765 was invested in paper mills, $71,708,223 in pulp mills, and $157,115,716 in pulp and paper mills. Classified by items of capital, land, buildings and fixtures, amounted to $117,805,581, machinery and tools to $60,627,266, materials on hand, stocks in process, etc., $39,6__52,078, and cash, trading and operating accounts and bills receivable to $22,259,779. By provinces, the amount invested was: British Columbia, $42,-705,988; Ontario, $88,576,807; Quebec, $101,-456,296; New Brunswick, $7,852,225, and Nova Scotia, $753,388.

MR. BARNJUM'S TIMELY AID.

The Canadian Forestry Association has received from Mr. Frank J. D. Barnjum, of Annapolis Royal, N.S., a gift of one thousand dollars to aid in developing forest protection propaganda in all parts of the Dominion.

Mr. Barnjum's generous gift came in response to an appeal to help make up the deficit in our income caused by the unexpected cancellation of the Dominion Government's grant of four thousand dollars a year.

In an article in the Pulp and Paper Magazine recently, Mr. Barnjum offered to subscribe ten thousand dollars to the Canadian Forestry Association provided that the chief pulp and paper companies of Canada would do likewise.

THE WOODLANDS MEETING.

The meeting of the Woodlands Section of the Canadian Pulp and Paper Association at Montreal on January 29th, drew an excellent attendance from many parts of Eastern Canada. In the absence of Mr. Ellwood Wilson an address on Aerial Photography, illustrated with lantern slides and photographs, was given by Mr. Stuart Graham, who conducted the aviation experiments in the St. Maurice Valley last summer. Part of Mr. Wilson's paper will be given in the next issue of the Forestry Journal. Mr. R. P. Kernan acted as chairman.

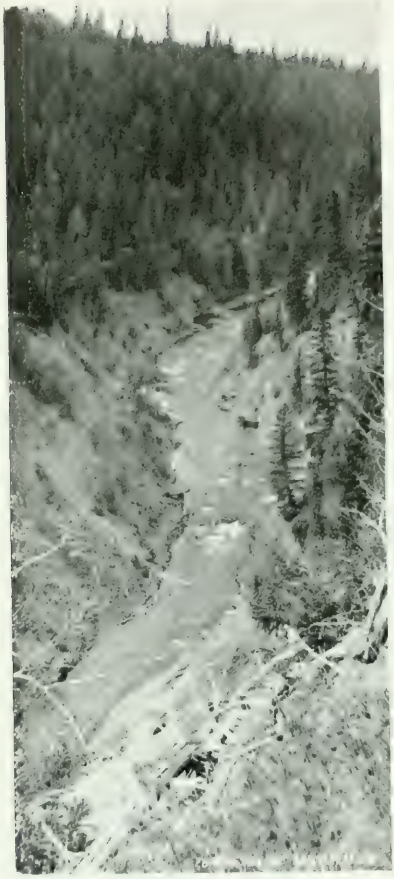


TWO TREES THAT GROW AS ONE.

A British Columbia picture of two Douglas Firs completely grafted.

"Men of the wilderness, fierce mountains love you;
Proud rivers leap when you ride on their breast;
See the austere sky, pensive above you,
Dons all her jewels to smile on your rest.
Children of Freedom, scornful of frontiers,
We who are weaklings honor your worth,
Lords of the wilderness, Princes of Pioneers,
Let's have a rouse that will ring round the earth."

ROBERT W. SERVICE.









BLACKWATER RIVER, BRITISH COLUMBIA.

A—Second canon near mouth. Very typical of many deeply eroded river channels in the interior of the province.
B—Fall below Tsacha lake.
C—Canon at Telegraph Trail crossing.
D—Cascades below Chine lake.

HINTS ON SELECTING SHADE TREES

By F. E. Buck, B.S.A., Assistant to Dominion Horticulturist.

In nearly all cases it will pay to procure good nursery-grown trees. They have two distinct advantages over trees dug up from the fields or woods. In the first place they generally have a larger number of feeding roots, enabling them to withstand the transplanting process better, and they are better able also to withstand heat and light conditions which prevail in towns and cities, young trees growing in woods generally being weakened by the shade of surrounding trees.

The question of the size of the tree is of some importance. Greater success is possible when small or medium-size trees are used. A large-sized tree requires more attention after it is planted, to tide it over the critical period following transplanting. Elms and maples are generally procurable in larger sizes, and are more likely to succeed ,than most other varieties.

For wide streets ,avenues, or boulevards, trees of the type of the elm, which is remarkable for its vase-like and graceful form, are more suitable than compact round-headed trees, of the type of the Norway maple.

Trees of the type of the Silver maple or even the Carolina poplar should not be selected except for some special purpose. The wood of such trees is soft and brittle, and limbs are easily broken off in sleet or wind storms. The risk of damage to life and property at such times must be considered in selecting such trees.

Trees which have a natural beauty which is spoilt when they are pruned of their lower branches, such as the beech, the Weeping Silver maple, or the Weeping birch, are not suitable for streets or avenues.

Trees which shed their flowering, or fruiting organs, such as the Balsam and Carolina poplar, the Horse chestnut, or the Catalpa, and keep the sidewalks untidy for some weeks each year, are not desirable street trees.

Trees which are short-lived ,or subject to insect attacks, or are difficult to transplant, are not as a rule desirable for city streets.

TIME TO PLANT.

The very best time of the year to plant all kinds of trees and shrubs is early in the spring before the buds begin to burst. The actual dates vary with the season and the locality. As a general statement, it may be said that in April or early May would be all right, or just as soon as the ground has thawed out and dried out sufficiently so that the soil is mellow enough and suitable for working in well around the roots. Periods of dull weather afford a good opportunity to do planting successfully.

Where the planting can be more conveniently accomplished in the autumn, the best period to plant is as soon as the leaves begin to fall, which is generally the latter part of October. Evergreens, however, must be planted earlier than October. In September and not later than the 15th has been found to be a good time to plant them. Planted at that time, they have an opportunity to become established before winter sets in.

DISTANCES APART AND POSITION.

The area of the root system of any tree is generally equal to, and in a few cases greater than, the spread of the branches above the ground. Therefore if the branches of two trees meet their root systems will interlock, and it is important to take this into consideration in the planting and care of street trees, otherwise the proper provision of an adequate feeding area may be overlooked. Trees may be slowly starved to death, in which case, many of their large limbs die, and disfigurement of once handsome trees is the result.

In most city streets of a residential character, the best position for shade trees is in what is called a "Parking Strip," which is the strip of ground or greensward between the curb and the sidewalk. It is well not to have this less than four feet wide, and in this strip the trees should be planted at distances ranging from forty to fifty feet apart. When the roadway is first built, and the width of the street from house line to house line permits, it is best to make such strips ten or twelve feet wide. Frequently, of course, no "Parking" strip is provided, and in such cases the trees must be planted on the strip between the sidewalk and the houses. Streets sixty feet wide from property line to property line, may be laid out to advantage as follows: Soil space between the property and the sidewalk, four feet; sidewalk, five feet; planting strip, six feet; roadway, thirty feet.

No street should be planted with more than one variety of tree, and these should be planted at uniform distances apart, and in an even line.

ONTARIO FARMERS WANT TO COMMENCE TREE-GROWING

A sign of the farmers' interest in this important matter of increasing the forest area was given at the meeting of York (Ontario) County Council, by Reeve George Padget, of Markham Township, a farmer representing one of the best agricultural districts in the country, moving the appointment of a committee to investigate the possibilities for acquiring land in the county for reforestation by the county authorities. The council was unanimous in supporting Reeve Padget's suggestion, and in discussion of the matter members advanced strong arguments in favor of reforestation, not the least important of them being those in reference to the effect of forest growth on stream regulation, in preventing the occurrence of blow sand areas, and in providing refuge for wild birds; all matters affecting agriculture most directly.

Particularly interesting information with regard to the results of removing pine from sandy land without making provision for the encouragement of second growth was provided by Mr. F. Stickwood, a member of the council representing the Township of East Gwillimbury.

Mr. Stickwood spoke out of his own experience of lumbering pine on sandy land in the north-eastern portion of the county, with a view to growing crops on a portion of the cleared area. In cases where the second growth pine had been given reasonable encouragement by leaving the surrounding tree growth fairly thick, good results in the way of new timber had been attained. But where the land was cleared for the growth of farm crops ,and not provided with a libertl supply of humus artificially, the result had been disastrous after two years of cropping.

Interviewed with regard to the possibilities for growing crops on sandy land from which pine had been removed, Mr. Stickwood went into particulars of his experience on his own farm. For two seasons after removing a fine growth of pine from what is now one of his back fields, he secured excellent crops of fall wheat. But after the second year the black surface soil began to drift, and the subsoil that was left—a sharp sand—proved anything but satisfactory for crop-growing. Mr. Stickwood was emphatic in declaring that the pine land should either be kept in pine or, if cleared, should be treate dimmediately with heavy applications of barnyard manure in order to keep the good soil in place and provide for a supply of fertility for a considerable period.

COL. J. S. DENNIS' MESSAGE.

From a telegram sent to the annual meeting of the Canadian Forestry Association at Quebec by Col. J. S. Dennis, Chief Commissioner of Colonization and Development, Canadian Pacific Railway:

"The Association is doing magnificent work and is deserving of the strongest support possible from all Canadian interests."

In the December issue of the Forestry Journal omission was made of an acknowledgement to Mr. G. B. Sudworth, Dendrologist of the United States Forest Service, Washington, D.C., for his courtesy in allowing the use of a photograph showing a Sequoia tree stump.

"I believe the work you are doing is so important and the demands on your members so moderate that you should receive all the support possible."—Chas. M. Cotton, Barrister, Montreal.

"Personally, I consider the work of your Association is doing is very beneficial, not only to the holders of limits, but to Canada as a whole."—Col. William Hendrie, Hamilton.

"Anything that I can do to further the objects of your Association will afford me sincere pleasure."—Dr. J. L. Chabot, M.P., Ottawa.

"I sincerely hope the Federal Government will be prepared to back any action approved by your Association."—Major Hume Cronyn, M.P., London, Ont.

"I have always appreciated the great work the Canadian Forestry Association has been doing and have been studying your publications."—Fred V. Seibert, D.L.S., Edmonton.

"I am heartily with you, and am willing to do anything within reason to assist. I like the forest, and when I answer its call I like to find green trees and grass and not black stumps and ashes."—E. A. Paulson, Winnipeg.



PUTTING IN TREES WITH A PLANTING BOARD.

Planting seedling trees by the million at Indian Head Nursery Station, Saskatchewan. The Yale Board, which holds about fifty seedlings at one time, is filled by the women working at the portable cabin. A series of planks is used as a straight-edge and a workman with a spade makes a V-shaped trench. The loaded planting-board is then placed in the trench and earth is pressed against the roots. One side of the board swings open and the machine is withdrawn leaving the seedlings firmly in position, equally distanced. This method makes tree planting a rapid and accurate process.



Photo by E. R. Morton, Ottawa.

AN UNCOMMON TRICK OF NATURE.

The original Red Oak tree stood high on the slope. A land slide split the roots and moved one section many feet down the hill, but did not completely divide the upper trunk. As a result, both roots have continued to grow and the central trunk has thoroughly healed over.

SIR LOMER GOUIN'S ADVICE ON FORESTRY

(From report of address to Canadian Pulp and Paper Association)

They should not forget that their supply of pulpwod was not inexhaustible. Formerly they had been very exacting, but now they were using balsam and short trees, to the advantage both of their men and of their forests, which became more productive as they were cleaned.

Sir Lomer's advice was to only cut from timberland what the timberland produced yearly. This would mean increased expenditure, but such expenditure would make the limits produce more, and give them a chance to return sooner to fields which had been exploited.

It was not sufficient to reduce the volume of cutting. They should think of restocking the timberlands. If they would do their share in this direction, the Quebec Government would do its share, and a big share (applause). He had heard pessimistic views about the forests, but he had great faith in their future. Quebec Province had more than half the pulpwood supply of Canada, and the largest extent of pulpwood forest left in the world, and this forest, efficient-managed, could be made to produce enormous quantities for ever.

The Quebec Government proposed making an inventory of the virgin forests, and had established forest posts at Hamilton Bay, Ungava Bay, and James Bay, which it was proposed to connect by wireless and supply with airplanes.

They realized the importance of keeping Quebec produce for Quebec mills, and would not hesitate, if necessary, to limit cutting to the use of mills in the province.

They had created schools in the cities of Quebec and Montreal to meet the need for highly trained technical men, and if a school of paper-making were required, they would give it. He would ask in return that as a good investment, the manufacturers should do all possible to encourage these schools. By so doing they would help the recruiting of the best artisans and technical men for their work.



AN OLD WHIPPING POST AT ANNAPOLIS ROYAL, NOVA SCOTIA.

An historical group of willows, the centre one having been planted during the French regime.



CANON ON WILLOW RIVER, B.C.
Suggested development for Prince George hydro-electric supply



NECHAKO RIVER, B.C.
Grand canon above outlet from Cheslatta lake.

GOVERNMENT RAILWAYS *and* ADJOINING FORESTS

It has always been a queer anomaly that the Canadian Government should make fire prevention laws applicable to the company-owned lines, and not to Government railways. Whatever betterments in fire protection on Government railways has come about is due to more or less personal and local arrangements between provincial forest protective organizations and government railway executive officers. This, of course, does not apply to the former Canadian Northern lines which have retained their efficient protective arrangements under the new form of management. At the meeting of the Quebec Forest Protective Association at Montreal, January 28th, the following resolution was passed:

"That delegates be appointed from the province of Quebec to accompany those from the provinces of Ontario and New Brunswick who will place before the Federal Government the desirability and urgent necessity of placing under the jurisdiction of the Board of Railway Commissioners those railroads which are not now subject to that Commission with regard to forest protection.

"That a copy of this resolution be forwarded to the Governments of the Province of Quebec, Ontario and New Brunswick, as well as to the Canadian Lumbermen's Association, accompanied by a request that they give their support to the said resolution.

"That the Government of the Province of Quebec be petitioned to place all owners of private forest lands amenable to the obligations and penalties contained in Clause 1641 of the Revised Statutes of the Province of Quebec, which now are only applicable to the owners of lands under license."



Bute inlet. Mount Superb, elevation about 8,000 feet.



Gardner canal, showing stream of intermittent type descending from glacier above.

TYPICAL VIEWS OF THE BRITISH COLUMBIA COAST LINE BORDERING THE INLETS.

KEEPING COAST FORESTS PRODUCTIVE

By Hon. T. D. Pattullo, Minister of Lands, Victoria, B.C.



Scientfic Study Necessary to Surmount Forestry Problems and Keep the Areas Permanently Under Wood Crops.



Timber is, and always will be, one of the main assets of this province. The commercial prosperity of our cities and towns and villages depends very seriously upon forest industries, while in country districts, development is helped forward by money which the latter derives from the marketing of minor forest products. Responsibility is upon the Government of the Province to safeguard the future of forest industries as well as to assist in their present day development.

FIRE PREVENTION.

In an ordinary year, more than a thousand organized logging operators cut into the present stand of timber. There is each summer inevitable destruction by fire. Insects make heavy inroads in some localitites. The question that must never be lost sight of is this, what is happening in the aggregate to this source of provincial wealth? Are we securing necessary information to enable us to know? Are our plans for protection and management adequate?

Necessarily the first duties of the Government department in charge of forestry have been to set up efficient machinery for forest fire prevention, revenue collection and all such matters of current administration. The long five years of war prevented any general attempt to do more than deal with daily business. But with the return of men from overseas, it has been possible to review the whole field of work and to provide, in reorganizing the department, for definite study of the condition of our forest resources to be undertaken. From now on such study will be carried on side by side with administrative work.

ESTIMATE OF SUPPLY.

More or less conjectural estimates have been made of our forest areas. In a recent statement, the mature merchantable timber is figured as covering something over 40,000 square miles. Two and a half times that area some 97,000 square miles is thought by officers of the department to be productive forest land on most of which, young timber is growing up after previous destruction of the crop by fire and logging.

In the moist region of the Coast, we have some of the fastest growing timber in the world, a fact established by actual investigation which has shown, in places, an annual increase of Douglas fir, amounting to 1,000 board feet per acre. Generally speaking, our knowledge of rate of growth throughout the province, is very meagre. Cedar, for instance, is thought to be coming back slower than other species, though it grows fairly rapidly to pole size. In the interior, growth is, of course, far slower than on the coast, and already in certain sections, this matter is arousing attention because the immediately accessible timber of the present mature crop is beginning to approach the cut-out stage. But making all due allowance for annual loss from fire and insects and decay, the estimated average increase of 100 board feet per acre every year certainly appears conservative. Yet at this figure, the area of young growing forest now conjectured to exist would show an increase each year of something over six million feet, five times the annual cut at present.

DIMINISHING SUPPLY.

It is this figure which has aroused considerable criticism among lumbering operators who are faced, in their business, with an obviously diminishing supply of immediately accessible timber. Yet while a great proportion of the young forest is away back from present means of operation, it is there, growing up against the time when the cutting out of the present mature crop will compel the extension of operations into it. At the same time a note of alarm is struck by the statement of one investigator, who finds that half the logged-off lands in the southern coast region, are not sufficiently stocked with young growth. Plainly it is the duty of our forest service to secure definite information to replace such conjectural calculations, as those foregoing, since, in reality, the margin of safety may be far less than is supposed and

future policy in disposing of Crown timber cannot be soundly planned without. Attention to this is made more necessary because the cutting out of the timber supply of the Southern States, which has been so abnormally speeded up by war and reconstruction needs, will soon subject our western forests to a vastly increased demand.

YOUNG TIMBER SUFFERS.

While fires in mature timber are those most noticed, it is the young, growing forest that suffers most. Repeated burnings in areas no longer able to reseed themselves readily, destroy reproduction for long periods of years, and result in brush and scrub, where good young timber should be. From the reforestation point of view no duty comes before protection of young growth from fire—that is to say, young growth on true forest land. Obviously, for a Government department there is consequently the duty of land classification, so that that which is fit for agriculture, should be separated from that which nature properly devotes to forest reproduction. And to secure the future crop, forest fire prevention is the supreme duty of all.

It is upon this that our department has mainly concentrated hitherto. Through the adoption of up-to-date methods and most modern equipment ,every effort has been made to establish a high standard of efficiency. The increased cost of everything, makes necessary a corresponding increase in the fire tax to 2 cents an acre—cheerfully agreed to by the interests taxed —while the fire patrol system has been strengthened very considerably by the re-organization of staff, just completed. Prevention of forest fires is not the only matter involved—there is also the vitally important question of using fire to secure right reproduction, a question that needs careful and imediate study by the investigation office of the department.

INSECT DAMAGE.

Widespread devastation by bark beetles of some of the most valuable timber areas of the Province is taking place in the yellow pine country. Thirty million feet is the estimate of damage done in the Princeton section—no one knows the full extent of the loss. The whole stand of yellow pine in the interior is threatened with extermination.

STUDY OF DAMAGE.

Scientific study seems to promise some slight hope of checking the devastation, and a combined effort is being made this winter by the department and the timber owners concerned, with the co-operation of the Dominion Entomologist, to see what can be done in the recently attacked area of the Coldwater Valley. More than the loss of timber is at stake—there is the loss of industrial activity, commercial business, public revenue in the sections of the Province thus affected. The winter's work is concerned with cutting and salvaging the infested timber and burning the debris from it, so as to destroy the insects before they migrate to fresh timber in the spring. Provision is being made in the forthcoming estimates for continuing control experiments and everything that the department can do to hold the devastation in check will be done. Here again is shown the grave necessity of carrying on forest investigation as a maojr function of the department. Insect damage obviously offers a most difficult problem since the cost of control may in some cases be prohibitive; and it is by no means confined to yellow pine. Larch and lodgepole pine in the C. P. R. tie reserves in the Yahk country are known to be infected. The spruce budworm is reported in the Lillooet district and on Vancouver Island, and public attention has been drawn to the damage done in the big timber in Stanley Park. The blister rust is threatening extermination of the eastern white pine. Measures have been taken to prevent its spread westward, but we must watch carefully for it here.

PULP INDUSTRY DEVELOPMENT.

On the coast the pulp and paper industry is already on an established footing. The vast pulpwood areas of the interior and the north are still untouched. Increasing exhaustion of supply in the Eastern States means, inevitably, development of the pulp industry in interior British Columbia, in the near future. To compile information concerning our resources as a necessary function of a forest investigation office.

FORESTRY IN 1920.

The collection of a three million dollar forest revenue and the carrying out of current business, including the organized prevention of forest fires, is thus only one side of the work the department must carry on in 1920 if it is to discharge its duty properly. Vague theoretical studies are not in question—there is direct necessity for investigation of matters which have a practical bearing on current business and plans for the immediate future. Information is needed as a guide in the use of fire after logging, especially now that the law provides for a comprehensive scheme of slash disposal all over the province; as a basis of regulations in



CHARACTERISTIC VIEW OF INLET ON COAST.
East arm of Matheson channel.



DELTA LAND AT MOUTH OF LARGE U-SHAPED VALLEY.
Kemano river, Gardner canal.



HOMATHKO RIVER, LOOKING DOWNSTREAM TOWARDS BUTE INLET

selling Crown timber; to secure proper land classification ;to ascertain the real facts about reforestation and to show what can be done to hasten and improve the new crop.

BEST SPECIES REQUIRED.

We do not want inferior species to reproduce at the expense of better ones; we do not want money wasted on measures which fuller information might prove unnecessary. We need timber maps and yield tables and sample plots; data to furnish our cruisers with when estimating sale timber; establishment of working plans for large untouched, unalienated areas of reserve timber, such as the Yahk basin; much technical information which war time has made it impossible hitherto to secure. Forest investigatior must be recognized as an essential of forest administration. Not for their wrecking value, but as a perpetual crop must we administer the great timber resources of British Columbia.

PRAIRIE TREE PLANTING ON WHOLESALE BASIS

Readers of the Forestry Journal who have followed recent articles on tree planting on the prairies will read appreciatively this editorial from the alert "Regina Post":

It is interesting to note that a committee of the Legislature under the chairmanship of Mr. Murdo Cameron (Saskatoon County), spent a couple of hours yesterday hearing an address on the project of tree-planting, and discussion of the topic.

The subject is one which the Post has dealt with in several editorials. It is a small matter, in a way, and yet a very important one, inasmuch as tree-planting will do a great deal in the way of making Saskatchewan a better place to live in. Every home in the province can be made more attractive and more of a real home with the expenditure of comparatively little money and time. And at the same time several hundred dollars may be added to the value of every farm.

MORE TREES REQUIRED.

Two considerable handicaps to Saskatchewan are the cold winds which sweep over the prairie in the winter time, and the hot winds which dry the soil so rapidly in the crop season. The cold winds of the winter make life on the farm much less pleasant, and make it more difficult to care for live-stock. The roads are blocked by snowdrifts, and the farm folk find difficulty in getting to town or in visiting their neighbors. The hot winds of the summer take moisture from the plowed grounds at a rapid rate. Both can be greatly ameliorated by tree-planting along the roads, around the homes, and in clumps at convenient locations.

No one who has lived on the prairie needs to be told the difference in conditions observable when driving from the open prairie into an avenue of trees. There is actually no difference in temperature, of course, but the difference seems to the wayfarer about thirty degrees because of the wind-break. The home is more easily heated when surrounded by trees. Livestock can be left out in much more severe weather. In the summer time the trees bring more moisture to the soil and retard evaporation by breaking the force of the hot breezes.

THE MENACE OF CONSTANT WIND.

The tree nurseries of the Dominion Government at Indian Head and at Sutherland are supplying millions of trees and cuttings to the farmers of the province every year, and the appearance of the "treeless prairies" is slowly being altered, as everyone who travels over the country knows. But the pity is that the number of trees set out each year is not multiplied by four or five or six. They are obtainable free of charge, and each one adds sufficient value to the farm on which it is planted to amply repay the farmer for any expenditure of time or energy necessary for the work. Along with the trees, by the way, the nursery stations supply full instructions as to planting methods.

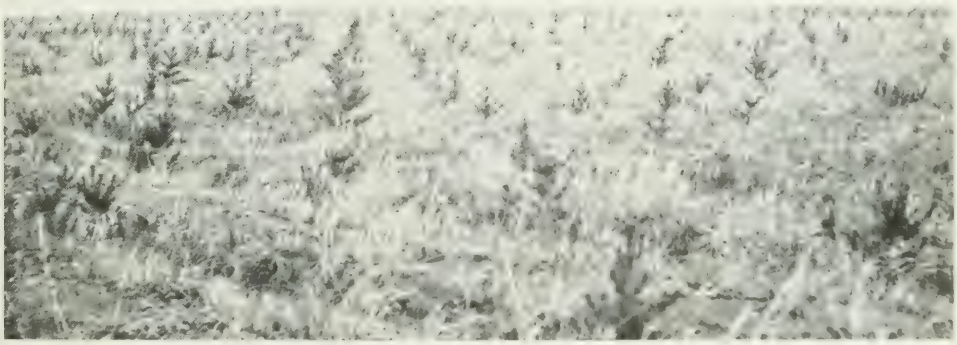
Whatever assistance the government and legislature can give to advance the work of tree-planting ought to be given. It might, for instance, assist the municipalities in getting the roads lined with trees, by providing part of the money to defray the cost, just as it does with actual road construction.



ESTABLISHING A PRAIRIE TREE PLANTATION.

The upper picture was taken in 1916 and shows the preparation of land for tree growing at Indian Head, Sask. Some of the trenches have already been filled with young spruce trees.

The lower picture was taken over the same area in 1919, and illustrates rapid and healthy development.



THE ASSOCIATION'S ANNUAL MEETING

At the annual meeting of the Canadian Forestry Association, held at the Chateau Frontenac, Que., on Feb. 3rd, Mr. Clyde Leavitt acted as Chairman, in the absence of Mr. J. S. Gillies, the President.

A motion was introduced by Mr. R. O. Sweezey favoring the increase in the number of Directors of the Association from 35 to 45. Mr. Sweezey explained that since the Association's original board had been appointed, relatively few changes in personnel had occurred, and several important interests, such as the publishers, the banks, and the people of the prairie provinces were now inadequately represented. The motion carried without dissent. The Nominating Committee submitted to the meeting a list of officers and directors, with Mr. C. E. E. Ussher (passenger traffic manager of the C.P.R. and one of the first directors of the Association) as President, and Mr. Dan McLachlin of Arnprior, Ont., a well-known lumberman, as Vice-President. The following new Directors were appointed: Hon. Arthur Meighen, Angus McLean, J. A. Gillies, John Black, T. W. Dwight, Col. Thos. Cantley, W. E. Golding, Hon. N. Garneau, David Champoux, Avila Bedard, W. E. Bigwood, Cyril Young, Vere C. Brown, John W. Dafoe, G. P. Marnoch, R. O. Sweezey.

The Treasurer's report for 1919 showed receipts of $20,167.00, including $4,600 from Government grants; $7,565.78 from membership fees, and $6,840.00 from special subscriptions. Expenditures amounted to $20,072.58, leaving a balance at Dec. 31, 1919, of $1,024.33.

Col. Harkom brought up the question of appointing regional committees, or boards ,to advise the Central Executive regarding special local problems. A motion was put through embodying the suggestion and commending consideration of it to the incoming executive:

The following resolution was passed:

"Whereas, the Canadian Forestry Association has demonstrated its usefulness in the spread of forestry propaganda throughout Canada and has endeavored to be of maximum usefulness in the protection of the forests administered by the Dominion Government;

"Resolved, that this Association, here assembled, petition the Minister of the Interior to restore the annual grant of $4,000 hitherto given to the Association's work, and recently suspended."



BRIDGE RIVER VALLEY ABOVE CANON, BRITISH COLUMBIA.



QUESNEL RIVER—FALL ON NORTH FORK.
About two miles below Cariboo lake. Attempt to construct fish ladder seen on left.

CONDITIONS IN PRAIRIE PROVINCE FORESTS

By H. C. Wallin, Chief of Surveys, Dominion Forestry Branch.

We have examined in Manitoba altogether 46,272 square miles. This area covers the country from the settled districts northwards to about township 58, east of Lake Winnipeg, and to township 51 west of said lake and Lake Winnipegosis. It also includes the country adjacent to the Hudson's Bay Railway, and the Riding Mountain, Duck Mountain, and Porcupine No. 1 Forest Reserve. In the following estimate, these reserves and the country along the H. B. Railway are not included. The area to which the figures, I now give, refer is therefore 30,340 square miles. Of this 24 per cent is timbered (posts, poles, included)

36% recent burn or covered with young reproduction;
35% muskeg;
5% grassland, water or cultivated.

Of the timber, approximately 25,000,000 cords, about 30 per cent is poplar, 25 per cent jack pine, 25 per cent spruce, and the remaining 16 per cent is tamarack, birch and poplar.

IN SASKATCHEWAN.

In Saskatchewan the total area examined is 27,504 square miles, covering a tract reaching from the settled district northwards to about township 66. If we deduct the area of the forest reserves, with the exception of the Big River Reserve, we have an area of about 20,000 square miles, covering the country around Big River, Beaver River, Waterhen Lake, Dore Lake, Montreal Lake, Candle Lake, and Amish Lake. Of this—

41% is timbered;
18% is burn;
33% is muskeg, and
8% is grassland, water, etc.

The amount of timber per square mile is here greater than in Manitoba, no doubt due to the fact that a lesser area has been burned over in recent years. The total number of cords available is estimated to be between 40 and 50 million cords. Of this about 75 per cent is aspen and poplar, 13 per cent spruce, 10 per cent jack pine, and 2 per cent tamarack, birch and balsam.

ALBERTA'S FORESTS.

In Alberta, we have examined 63,000 square miles covering the Rocky Mountain Forest Reserve, the Grand Prairie and Clear Hills District, the Peace River Block, the country between the Athabasca River and Lesser Slave Lake, the Pembina Mountain, Lac la Biche, Christina Lake, and Cold Lake Districts, leaving out the Rocky Mountain Forest Reserve. This area occupies 41,371 square miles, of which

48% is timbered;
32% burn;
5% muskeg;
15% prairie.

The timber amounts to some 100 million cords, of which 40 per cent is poplar, 30 per cent spruce, 25 per cent jack pine and lodgepole pine ,and 5 per cent tamarack, balsam fir and birch.

From the above it follows that at present aspen is the predominating species in the district north of the prairies in the middle west. Spruce (and jack pine) which of course is commercially the more important species, lags considerably behind. The only practical way of reversing the situation is to keep the fires out until the forest has returned to the original type and wait for many years, except, perhaps, on limited areas on forest reserves where through a judicious system of cutting, or through planting, reproduction of spruce may be established at an earlier date.

TO REACH THE CHILDREN OF CANADA

The doors of ten thousand schools are now open to the interesting propaganda of the Canadian Forestry Association.

Invitations to carry on educational addresses with motion pictures are coming in in such numbers as make the Association's facilities conspicuously inadequate. Cape Breton, New Brunswick, Quebec, Ontario—indeed every section of the Dominion—offers us the opportunity to win the younger generation to an intelligent understanding of the forest resources and their protection from needless waste.

The cost of establishing and maintaining a proficient Children's Lecturer would be about $6,000 a year.

The consequences of his efforts in even one year could hardly be measured by a sum even one hundred times the annual outlay.

What member of the Association is willing to assume the first year's expenses of a Children's Lecturer working from Coast to Coast and to have his name identified with the benefaction?

What members of the Association are willing to aid, in any amount, this most promising enterprise?

The Secretary, Mr. Robson Black, 206 Booth Building, will be glad to enter into correspondence with members regarding this proposal.

A TYPICAL LETTER.

From the International Elevator Co., Winnipeg.

"We have pleasure in enclosing money order for $2.00.

"We appreciate the good work your Association is doing and the valuable information contained in the Journal, and we wish you continued success in your undertaking.

MORE LAND FOR MANITOBA.

Winnipeg.—Reclamation of 700,000 acres of fertile land in the Pas District will be carried out after the necessary legislation has been secured at the Manitoba Legislature, according to Hon. Edward Brown, Provincial Treasurer. The project will cost $2,000,000, and in addition to this $1 per acre must be paid to the Dominion Government. The land, which is situated in Northern Manitoba, close to the Saskatchewan border, will be worth $20 per acre. It lies in a triangle shape between the Saskatchewan river, the Carrot river, and the Sapanok channel.

IN PENNSYLVANIA.

Mining companies planted over 290,000 forest trees during 1919, all of which were distributed by the Pennsylvania Department of Forestry.

In Lackawanna county, seven tree planters set out 324,000 forest trees during 1919.

In the whole State of Pennsylvania 791 tree planters set out 3,139,631 forest trees during 1919.

A GUIDE TO ONTARIO TREE PLANTERS

By F. S. Newman, Manager of the Provincial Forest Nurseries, St. Williams, Ont.

The urgent necessity for extensive reforestation is evident when we observe the rapidity with which the productive forest area in Ontario is decreasing and the condition in which the greater part of the cut-over land is left. Heretofore when one region was exploited, and the timber removed, new areas of virgin forests were cut, leaving ever increasing tracts of waste land. In the southern part of the province, or "Old Ontario" there are frequent farm woodlots, which although providing wood products now, are not reproducing naturally. The time is fast approaching when these woodlots will be entirely cut down, hence it is apparent that future wood crops must be provided by means of reforestation.

MEANING OF REFORESTATION.

Reforestation means the growing of new forests. This may be attained by natural reproduction from "mother" trees, or by artificial restocking. The latter system has been found to be the most satisfactory, providing uniform stands of pure or mixed sorts as desired. Natural seeding is patchy, uncertain and incomplete. Abandoned farms and waste lands that have been allowed to run out, or that have been repeatedly lumbered and burned over, are more often lacking in sufficient seed trees, and consequently reproduction is possible only by means of artificial reproduction. This issue is attained by procuring forest seedlings with due regard to their suitability to the area or site on which they are to be planted.

CHOICE OF SPECIES.

Although the first factor in the choice of species is that those selected are sufficiently corelated to develop into a good stand, they must also conform to the particular object that the owner has in view when he makes the selection.

The two general objects that are usually entertained in establishing a plantation may be classified, viz:

(a) The production of wood or other forest products;

(b) The protection which a forest affords.

Where the choice is made with the object of producing fuel, posts, lumber, etc., in the greatest quantity in the shortest possible time, such species as birch and Carolina poplar form a rapid wood crop, which though of somewhat inferior quality, provides good summer wood and brings a fair price on the market. Black locust is without peer for posts and poles, making an exceptionally rapid growth and possessing excellent qualities as to durability. Where a timber crop is the object, White, Scotch, and Red Pines excel in lumber production.

TO MODERATE WINDS.

Trees grown for protective purposes should be effective in checking wind velocity, in preventing land slip on steep hill sides, in regulating water flow and in retarding soil erosion by both wind and water. Hemlocks, pines and spruces for mthe best windbreaks, while the deeper-rooted hickories and oaks excel in preventing land slip and erosion. The nature of the soil whereon the planting is to be done, must also be taken into consideration. Artificial regeneration may fail on account of the soil not meeting with the requirements of certain species. All trees grow better on deep, porous, moist, soil, rich in humus and mineral nutrients.

In many places although the soil is fertile, the ground surface is so steep and rough that farming thereon is impossible. On such places as these, walnut, white ash, cherry, beech and other exacting species might be advisably planted. On less exacting sites, that is on light sandy or gravelly soils, white pine, Scotch pine, red pine, red cedar and upland oaks should do well, while the shallow rooted species such as spruce, maple, elm, etc., are best suited to the heavier clay soils. A safe guide in choosing which species are best suited to the prospective area to be planted, is to observe stands of timber on adjacent woodlands, comparing the soil conditions and assessing the development in order to judge, whether or not, the trees are growing under favorable conditions.

WHERE SEEDLINGS ARE OBTAINED.

Careful attention having been given as to choice of species, the next step is to procure the seedlings. Upon applying to E. J. Zavitz, Provincial Forester for Ontario, Forestry Branch, 17 Queen's Park, Toronto, forest seedlings may be obtained from the provincial forest nurseries at St. Williams, Ont. These seedlings are packed and shipped early in May. They

are free, the only expense to the consignee being the transportation charges thereon.

PROCEDUURE WHEN PLANTING.

When the seedlings arrive they should be unpacked at once and "heeled in," on or near the area to be planted. By "healing in" we mean, that the seedlings are dipped in water, the roots placed in a trench, after which they are covered with earth which is firmly packed around the young trees by tramping and "heeling in." This excludes all air, thus preventing the roots from drying. If the area that is to be planted is grassy, remove about 1½ feet square of sod at the spot where each seedling is to be placed. This procedure entails a little extra labor and expense, but will pay in the end. Another quicker and cheaper method of planting where it is soddy may be applied by ploughing furrows at the required distance apart and planting the trees in the furrows. In many places, however, the removal of sod is unnecessary.

When actually planting, too great care cannot be taken. Two men form one planting gang. One man prepares the hole while the other carries the seedlings roots immersed in a pail of water. A V-shaped hole is made, in which the seedling is placed in an erect position. Particular pains should be taken to plant at the old depth and in tramping the earth firmly about the roots.

GRAZING TRESPASS PUNISHED.

The first case to establish the right of the Forestry Branch of the Department of the Interior to collect a penalty from ranchers grazing live stock on the forestry reserves, was tried in the Supreme Court at Macleod, Alberta, recently, and Mr. Justice Walsh decreed in favor of the Department of the Interior. John Nelson, of Meadow Creek, was the defendant, and he was fined $595 and costs. Witness fees totalled $390.

The decision was considered important in view of the fact that close to 50,000 head of cattle and horses graze within the forest reserves of Alberta. The Department charges eight cents a month per head for cattle, and ten cents per month for every horse .

The Manitoba Free Press: "Regarded both from the viewpoint of our own convenience and as a chief source of national wealth, the forests of the Dominion commend themselves to the particular care of the Canadian people. Their very magnitude may easily result in their destruction, or at least in a net reduction of their extent, which no amount of contortion and regret will avail to make good. A definite policy of conservation and replacement is required as a precautionary measure and to fulfill the duty of this generation as trustees for posterity."

"I want to congratulate you on the excellent progress the Association has made in spite of war conditions."—Dr. B. E. Fernow, Dean Emeritus, Faculty of Forestry, University of Toronto.



The nest of a red-tailed hawk, made of twigs, large enough to fill a tub. Photo taken on the Spruce Woods Forest Reserve, Manitoba.

TO EVERY MEMBER—A TIMELY WORD!

The Dominion Government grant, which has been paid to the Canadian Forestry Association for the past twelve years, has been suspended. In 1919 the amount provided in the Parliamentary Estimates for the Association was $4,000. Only a part of this was received and the Association has no notification that any further sums will be paid to it from the Dominion Treasury.

The Association appeals to its great body of members to modify the handicap placed upon its work through the loss of the Dominion grant by prompt payment of the annual fees.

Please bear in mind that your Membership in the Association is a vital force working towards a great national end. The subscription to the Illus trated Journal is just one feature of your relation to the Association. The two-dollar inclusive fee for 1920 pays for the higher publishing costs of the Journal and puts muscle into the widespread educational activities of the Association.

The Canadian Forestry Association is not identified with any Government or commercial interests. It is a Union of Ten Thousand Citizens.

BRITISH COLUMBIA'S FINE RECORD

The cost of fire-fighting during the 1919 season is placed at $153,000, to which is added the cost of patrol, trails, forest fire pumps, cars, launches, and fire-fighting tools, bringing the total for the year to approximately $330,000. When this is compared with the fire loss for the neighboring United States Forest District No. 1, with the destruction of three billion feet of green timber and a fire-fighting cost of $2,500,000, it will be seen that the British Columbia Forest Service emerged from a season of exceptional fire hazard with a comparatively small loss and not a little credit.

EXCEPTIONAL HAZARDS.

Special mention is made of the fact that the fire season of 1919 was one of exceptional hazard not only throughout British Columbia, but throughout the Dominion and the United States. Quite early in the fire season, the forest protection force was actively engaged in fire-fighting, the most serious situation being found in the southern interior.

AREA PATROLLED.

The actual area over which patrol is maintained is 124 million acres, divided into seven districts under district foresters. These are again divided into ranger districts, of which there are fifty in the province. During the close season, from May 1 to Oct. 1, an additional temporary force is employed. This force of assistant forest rangers acts under the local ranger. For certain districts, which have periods of intense fire risk, an additional force of patrolmen, employed for periods ranging from one month upwards, are put on to help in the work of fire prevention. Appointments to the ranger and assistant ranger positions are by examination; woods experience, fire fighting and general knowledge being taken into consideration. Practically every vacancy in these positions during the season 1919 was filled by a returned soldier.

PLENTY OF EQUIPMENT.

The report shows that modern fire fighting equipment has been tried out, notably the forest fire pump, which proved to be of great value to fire fighters during the past season. During the coming year, a far greater number of these pumps will be placed in the hands of the field force. These pumps will embody all the improvements suggested as a result of last year's trials.



GOING TO BUILD SCOTLAND'S FORESTS.
Portion of 600 sacks of Sitka Spruce cones on the dock at Port Clements, Queen Charlotte Islands, B.C. Collected for the Board of Agriculture for Scotland by the Dominion Forestry Branch, under direction of B. R. Morton.

REFORESTING SCOTLAND WITH CANADIAN SEEDS

In reply to a letter asking how well British Columbia seeds were doing in the Scottish reforestation operations, Col. W. S. Fotheringham, in charge, writes as follows:

"During the years 1918 and 1919, considerable quantities of seed of various coniferous species were specially collected in Canada under the direction of R. H. Campbell, of the Dominion Forestry Branch. In 1918, consignments of seed of white spruce, white pine, lowland fir and red cedar were received. The seed was distributed between two nurseries, one in the north-east of Scotland and the other in the west. Before being sown, the seed was tested at the seed testing station of the Scottish Board of Agriculture and showed satisfactory results in the case of white spruce and western red cedar. The lowland fir and white pine gave only poor results. The subsequent germination of the nursery beds confirmed these tests. A large number of seedlings of white spruce and western red cedar were obtained. The preparation and cleaning of the seed had been carefully done, as the tests for purity confirmed.

"In the year 1919, seeds were received of Douglas fir, Sitka spruce and birch. The germination and purity tests were again of a high order, and about 2½ million seedlings were obtained. In this case, a quantity of the Douglas fir seed was sown at Murthly, in Perthshire, and the number of seedlings obtained per pound of seed was much greater than that obtained in the northern nursery.

"The species of Canadian seed principally required are Douglas fir and Sitka spruce, and it is highly desirable that the localities in which these seeds are collected should conform as nearly as possible with the climatic conditions in which the trees are to be grown ultimately. A note regarding the climate conditions of the various districts in which seed is collected would be of considerable value in allocating the seed and subsequently the seedlings to districts in Scotland, such as east or west coasts, high or low elevations, and generally to place the trees under conditions of growth as similar as possible to that of their native habitat."

CONVENTION SPEECHES.

Men would rather hear one practical plan for doing one thing than the principles for doing a thousand.

Many a speech would never have been delivered if the speaker had first had some one read it to him.

People like a speaker who talks a little too long, just the same as they like a train that is a little too late.

Remember, your speech is not just twenty minutes long—it is twenty minutes multiplied by the number of people in the room.

—*American Lumberman.*

HOW FAST DO SPRUCE FORESTS GROW?

"If the pulp and paper mills of Canada can use 90 or 95 per cent of balsam in newsprint manufacture we have nothing much to worry about as to the future pulp wood supply of Eastern Canada," said Dr. C. D. Howe, at the meeting of the Woodlands Section of the Canadian Pulp and Paper Association at Montreal last month. Dr. Howe's interesting remark was brought out by questions from members of the audience as to the economic effect of the very slow reproduction of spruce on the cut-over lands of Central Quebec. Dr. Howe emphasized, however, that spruce must be produced to meet the demands for better grades of paper and for sawlogs.

As to the rate of growth of spruce trees on the sample plots established by the Commission of Conservation and the pulp and paper companies in Central Quebec, Dr. Howe said that he found the new spruce trees, coming in since the previous cut, showed a growth of one ince in diameter in forty years and two inches in sixty years.

THE FIRE EXPERIENCE OF QUEBEC ASSOCIATIONS

The months of May and June last year constituted one of the most hazardous seasons that has imperilled the forests in the St. Maurice Valley for many years. This put a special pressure upon the organization of the St. Maurice Forest Protective Association (Henry Sorgius, manager), but as usual, found this association equal to any emergency. Fifty-two per cent of the fires were traceable to the railway companies, chiefly the government-owned railways. President Robert F. Grant strongly recommends that more money should be expended for educational purposes.

Manager Sorgius reports that the fire losses in 1919 were the heaviest since 1915. The patrol force consisted of six inspectors, one sub-inspector, and 69 patrolmen. There were 169 forest fires, 48 per cent of the total area burned was cut-over land, 37 per cent in old burn, and 15 per cent in merchantable timber and young growth. Fifty-nine per cent of the damage done was caused by two fires set by locomotive and dam-keepers. The area burned amounted to 41,320 acres.

The Ottawa River Forest Protective Association, Mr. Arthur Graham, manager, covers 26,618 square miles of territory. In 1919 was encountered one of the worst fire seasons since 1914. The permanent patrol staff numbered 200 men, including 11 inspectors. In the eastern section, 4,717 acres were burned over, only 218 acres representing merchantable timber. In the western section 83,467 acres were burned over, of which 20,694 acres were under merchantable timber. These figures include both member and non-member areas.

The Laurentian Forest Protective Association utilized a staff of 67 men, covering an area of 11,163 square miles. There was a total of 69 fires as against 96 in 1918. The damage, however, was the heaviest since the association was formed, 58,037 acres being burned over. Mr. R. L. Seaborne, manager of the association, lays emphasis upon the carelessness of employees of the companies and fishermen in failing to extinguish fires during the dry season. He also stresses the urgent need of more intensive educational work.

The report of the Eastern Division of the Southern St. Lawrence Forest Protective Association, gives a total of 148 fires in 1919, burning over 1,590 acres. The total area patrolled was over 5,700,000 acres. Mr. J. D. Brule, manager of the eastern section, did most valuable work along publicity lines and managed to deliver 25 lectures during February and March, and do a great deal of other valuable educational work. In the western section, the manager, Mr. C. B. Guerin, reports 76 fires, which burned 1,726 acres. Mr. Guerin's territory covers over 3,400,000 acres. As with the other managers of the Forest Protective Association, Mr. Guerin is an enthusiast regarding educational work and has given every co-operation to the Canadian Forestry Associa tion, besides inaugurating special features of his own.

NEW OFFICERS WOODLANDS SECTION.

President, Brigadier-General J. B. White, D. S.O.; vice-president, S. H. DeCarteret; members of council, Frank Ritchie, Ellwood Wilson, and T. F. Kenny.

THE USES AND ABUSES OF AIRCRAFT

By Major K. E. Clayton-Kennedy.
(In an interview with the Canadian Forestry Journal)

"The flying man has an excusable and laudable desire to fly. If he is very junior he may desire publicity and plaudits and delight in being pictured as a 'hero birdman,' instead of realizing that an aeroplane pilot in commercial aviation is about as heroic as a taxi-driver. The 'hard-headed businessman' usually wants to accomplish certain objects, obtain information quickly, travel more expeditiously, etc.

"Unfortunately there have been several instances when the aforesaid hard-headed businessman has not applied ordinary business judgment and 'horse sense' to the schemes and proposals put forward by enthusiasts, for the combination of the theoretically romantic flying with some more prosaic business. A great majority of our returned flying officers are very young men of little business or organization experience. They went overseas, received intensive training for certain purposes, were given a machine, and detailed to do a certain job, which, in the majority of cases they did, to the entire satisfaction of all those against whom their efforts were not directed. If they brought the machine back so much the better. Mechanics took charge of it, and the flying officer did not usually think of it again until the next job of work came along. If he 'crashed,' he was told he was a careless lad, and to go and get another. Not three in a hundred knew the rudiments of maintenance, and practically none knew or cared anything of the costs thereof.

"So much may be attained by successful commercial aerial development, while the difficulties which admittedly exist and must be overcome are so great that immature attempts are apt to prove disastrous to the development of aviation. It must be realized that carrying out an aerial service involves skilled organization, and that the actual flying is really a very small part of the undertaking. To fly a machine intermittently is quite a simple matter, but to maintain a regular service is much more difficult, and involves a great deal of knowledge and executive ability quite aside from flying knowledge. Mapping from aid photographs is really a very highly technical undertaking, and the ordinary simple mosaic is not at all a true record and will not conform to an accurate survey unless it is carefully scaled and distortions corrected. The ordinary picture of this sort, shows all the topographical features in great detail, but there is no means of determining the exact scale, or the amount of distortions due to the camera not being truly vertical at the moment of exposure, except by the utilization of mechanical devices for measuring a tilt of the camera and its height at the moment of exposure, or by determining on the ground the correct positions of a sufficient number of points which can be identified on the photographs and deducting the scale and distortions of each photograph by comparing the relative positions of such fixed points as appear on it, with their true relative position as fixed on the ground. This involves the utilization of instruments of considerable precision in the hands of experts."

PRUSSIAN FORESTS AND THE REVOLUTION

The following from the Deutsche Forstzeitung, is of interest:

The social upheaval in Germany following the cessation of hostilities affected even the forests. For instance, on Jan. 11th, a party of about 50 people, armed with axes and saws, invaded the state forest in the Hanau district, and began to fell trees indiscriminately right in front of the forester's house. When he protested they drove him off with axes. Soldiers stationed nearby sided with the trespassers. A few days later another party of 50 or 60 men committed similar depredations on another part of the same forest, informing the forest officer that they were authorized to do so by the official appointed by the Soldiers' and Workers' Council of Hanau.

The forests near Nuremburg suffered even worse. Hundreds of men, women and children helped themselves to the timber, not only for their own use but to sell. Areas of 20 to 30 hectares were cut clean; even telephone and telegraph poles were cut and the wire carried away. From 60,000 to 70,000 marks' worth of wood was thus stolen from the Nuremberg crown forest each day.

IMPROVED WOODS METHODS FOR QUEBEC

Report of Committee on "Improved Logging Operations for Quebec," unanimously adopted at meeting of Woodlands Section at Montreal:

Your committee have the honor to report:

First—That the suggestion of having a committee to consult with the Hon. Minister of Lands and Forests, Quebec, is approved of, and we recommend that such committee shall consist of the members of the executive committee of the Province of Quebec Limit Holders' Association, to confer with the Minister on all matters relating to lands held under license from the Province of Quebec.

Second—That experiments be made in clean-burning at the option of the limit holder in conjunction with the Government Forest Service. The sample plots on which these experiments are made to remain a distinct forest reserve for a sufficient length of time to permit of the results being studied.

Third—Operating companies to forward applications for inspections which they wish made by the Forestry Service of their territories six months before beginning operations.

Fourth—In order to increase the output, all operators should utilize and remove all diseased, lodged, blown-down, or burnt trees and tops in their cutting areas, if of a commercial value to the operator.

Fifth—That the personnel of the Forestry Service be increased and larger cash appropriations be made.

Sixth—That operators be advised that there are forestry engineers ,graduates of the Quebec Forestry School, who might be available where their services are required.

Seventh—Any limit-holder wishing to reforest any part of the territory he holds under license to cut from the Province of Quebec shall furnish a plan showing location of tract to be reforested and a programme of reforesting; these same to be studied and reported on by the Forestry Service.

The Government to furnish the necessary stock free.

The limit-holder to plant the stock in co-operation with the Forestry Service.

The expenditure to be reimbursed by the Government, deducting the amount from the limit holder's stumpage account for the current year.

The lands so reforested to continue to form part of the license.

CAN LUMBERMEN AFFORD TO BURN DEBRIS?

A forestry meeting that is certain to have an excellent effect was held at Montreal on January 28th, under the auspices of the Quebec Forest Protective Association. The attendance was excellent and the policy of having few formal papers and giving maximum time for general discussion proved most successful. The programme included the subjects of railway fire protection and slash disposal. An interesting paper, published elsewhere in this issue was read by Mr. Lyons of the Laurentide Company. Mr. J. D. Brule had also much interesting data derived from experiments in slash disposal on the limits of John Fenderson & Co., Sayabec, Que. The latter experiment lasted six days, three men being used to follow the logging crew. As trees were felled the limbs were piled and burned. Much difficulty was encountered in keeping the fires going. Mr. Brule based his figures of costs on a charge of $2 per day per man, and board at 75 cents per day per man. The stand contained 39 per cent spruce, 20 per cent fir, and 50 per cent cedar. The logging slash of 1,640 bd. feet was disposed of at a total cost of $4.42 per M. on one section. Other experiments showed a cost per M. of $3.20, $2.70, $2.50, $2.53, and for a solid cedar stand of $4.58, making an average of $3.32. For fir and spruce alone Mr. Brule gave an average cost of $2.73 per M.

COST HIGH FOR COMPANIES.

"Speaking of my section," said Mr. Brule, "lumbermen would have to increase from seven to ten the personnel of each logging crew if a clean burning of slash is to be obtained. At that rate it is certainly evident that operators will not attempt to do the work unless the Provincial Government is willing to meet them halfway in the expenditure."

As against the factor of increased cost, Mr. Brule believed that the chances for more generous reproduction of young trees were greatly increased. On an area of four to five acres he counted 297 young trees which were liberated through the piling and burning of slash. The destruction of natural nests for insect and fung-

ous infections was also accomplished by slash disposal.

THE WINDFALL MENACE.

Hon. W. R. Brown, of the Brown Corporation, expressed hismelf as unconvinced regarding the merits of top-lopping. After seven years he could discern very little beneficial effect in spruce operations.

Mr. J. A. Bothwell, President of the Canadian Pulp and Paper Association, stated that windfalls were responsible for more damage than logging slash. He thought that entomological work should take precedence to any plan for general slash disposal.

Mr. W. Gerard Power agreed with Mr. Bothwell, as to the great menace of windfalls in supplying fuel for fires. As concerns the River Ouelle Pulp and Lumber Company he was going to continue making experiments in slash disposal, and hoped in time to obtain some reliable data. Mr. Power said that he was absolutely in favor of clearing one hundred feet along the railways and a suitable distance adjacent to the main roads. His company had already done a good deal of slash burning along its roads.

Mr. R. P. Kernan, Chairman of the meeting, also emphasized the need of burning up debris along tote roads and main trails.

LOW COSTS IN PRAIRIE PROVINCES.

At the evening meeting of the Canadian Society of Forest Engineers, the question of disposal of logging debris was taken up by several foresters. Mr. Bristol, of the Delaware and Hudson Railway Company, told of the New York State law requiring lopping down to a three-inch top and regarded this regulation as materially reducing the fire hazard. Mr. E. H. Finlayson, District Inspector of Forest Reserves, Calgary, said that all sales by the Dominion Forestry Branch called for brush disposal. Some operations had shown a piling and burning cost of $1.85 per thousand board feet in stands where the crews were taking out to a diameter of five inches. Under more efficient methods the cost should not have been over $1.10 or $1.15 per thousand feet. In another large sale for railway tie purposes the cost reckoned up was 3 cents per tie.

Mr. C. MacFayden, District Inspector of Forest Reserves at Prince Albert, told the meeting that in Dominion Forestry Branch sales in Sas-

The Experience of the World's Greatest Experts in

AIRCRAFT CONSTRUCTION AND AERIAL TRANSPORT

is available for

APPLICATION TO YOUR BUSINESS

We are prepared to guarantee the successful operation of our

AERIAL FIRE PATROL and AERIAL PHOTOGRAPHY

The only firm in the world with practical Commercial Aviation Experience.

AIRCRAFT TRANSPORT AND TRAVEL LIMITED

London Office:
25 and 27 OLD QUEEN ST., S.W.1.

Montreal Office:
MONTREAL TRUST BUILDING

katchewan brush disposal was now taken as a matter of fact and Saskatchewan men were competing successfully with outsiders who were free from such restrictions. He gave an instance where on cordwood operations the brush disposal costs were 75 cents per cord.

PENNSYLVANIA'S TREE PLANTING.

Almost fifty million forest trees have been raised in the nurseries operated by the Pennsylvania Department of Forestry.

More than 34 million trees have been planted on the state forests during the last twenty years.

The water companies of Pennsylvania have received 1,730,000 forest trees for planting purposes from the Pennsylvania Department of Forestry during the last five years. They planted 599,275 tres in 1919.

In Union county, Pennsylvania, 58 tree planted 599,275 trees in 1919.

A PROGRESSIVE SUBSCRIBER.

Parry Sound, Ont.

"Enclosed please find my cheque to cover subscription for our eight camp foremen at Pakesley, and my own here. The foremen take a keen interest in the Journal, and I believe it will have a good effect on them regarding the care of fires in the bush during dry seasons. Also enclose cheque for $5.00 Contributing Fee. Wishing you every success in this work, I remain, yours truly,

"JAMES LUDGATE."

FROM REGINA, SASK.

"The breezy forcefulness of the 'Journal' indicate, to my mind, powers of initiative and originality, which should push your campaigns along rapidly.

"More strength to your arm.

"I take much pleasure in enclosing the fee of $5 to cover a 'Contributing Membership'."

WASTE PAPER AS A TREE SAVER.

(American Lumberman)

It is true, of course, that the demands for paper are now rather heavily crowding the present available capacity of present plants. There are, however, plenty of sites for paper mills within easy reach of many years' future supply. Our use of present paper supplies is also of the most wasteful sort imaginable. No rational effort has ever been made to gather up the once used paper and remanufacture it. The process is entirely practicable and economical, but the trouble is that the "dear public" is expected to gather up and tender the old newspapers as its contribution to conservation, without any adequate financial recompense. The price of 30 cents a hundred pounds for newspapers folded and bundled, offered by the man in the alley with the ramshackle wagon, dejected-looking horse and suspicious spring scales, represents $6 a ton, of which at least $1 is absorbed in the actual cost of gathering, folding and bunlding the papers. That leaves $5 a ton, and the fuel value of such newspapers is more than that if they are used in the furnace, especially for a quick fire in warming up the house on a cold morning. Why should the public save its old papers under such circumstances?

"Canoes that have made Maps and History."

EXPLORERS, TRADERS, AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS.

When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE AND BOAT CO., LTD.

LAKEFIELD, ONTARIO, CANADA

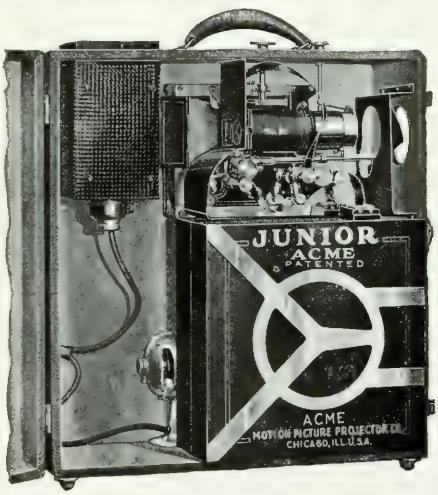
WHAT IT COSTS TO CLEAN UP A FOREST

The following interesting statements regarding the results of experiments in piling and burning the debris of logging operations on the Laurentide Company's limits, was presented at the Montreal Forestry Convention by Robert W. Lyons, B.Sc.F.

The following was carried out while making experimental cuttings in a balsam-spruce type, balsam forming 64 per cent of the stand. This area was cut over for white pine some years ago. Strips from one chain wide to three chains wide and fifty chains long were cut clean, and all logs were taken down to three inches top diameter. The slash on each alternate cut strip was burned.

Therefore, as a safe and economical method to dispose of slash, piling and burning as logging progresses, was employed as a practical remedy. The object was to burn the brush prior to the removal of logs. The plan followed promised to be feasible. It is, in brief, working two cutting crews together with two additional men for burning the brush. These men take the branches as they are cut and place them on the fire. These fires were usually placed to save reproduction and in a place suitable to the felling. The cutting crews were instructed to bunch the tops close to the fires, a 20-foot radius being the limit. If the branches should be wet, or after a fall of snow, the fire was usually started before the work commenced for the day. It took from three to five minutes to make, and two minutes more elapsed before branches could be thrown upon it steadily. However, if the branches were dry, the custom was to pile the debris into round compact piles, all the large ends lying in one direction, set fire to it and then continue piling on the slash. This relieved the men from facing a hot fire while the branches close to it were being piled. These piles could be started by the smallest blaze, and in a country of white birch, the time spent in making fires was practically eliminated. Therefore, thirty to forty minutes were saved daily. It might be noted, also, that in piling the

(Continued on page 92)



Weight, 22 lbs; Size, 17 inches long, 18 inches high, 7¾ inches wide.

PRICE $150.00.

This price applies only when machine is required for religious and educational work.

The Junior Acme

The Motion Picture Machine Everyone Can Afford to Own.

Takes standard 1,000 foot reels.

Motor Driven. Can be operated from the ordinary electric light.

It has every feature necessary to project a perfect rock-steady clear-cut picture.

Fitted with metal magazines, patented framing and focusing devices. Frames and focuses picture instantly.

Write for descriptive circular.

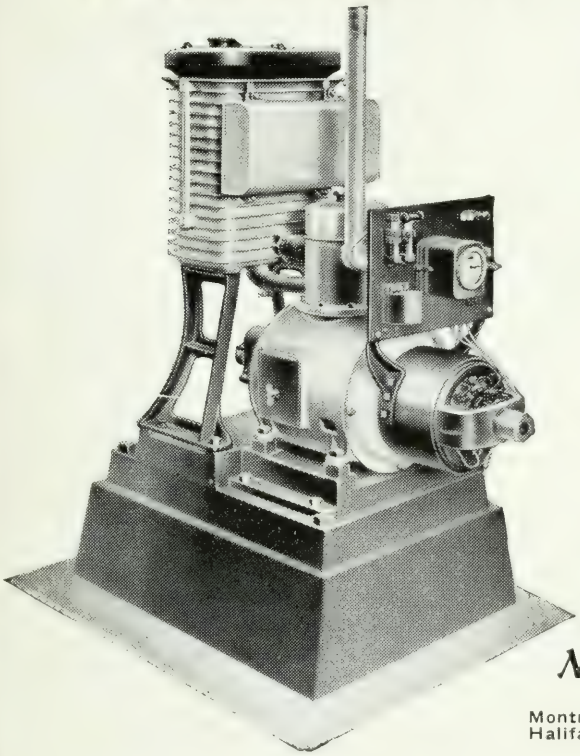
SUPPLIES COMPANY OF CANADA LIMITED

65 SPARKS STREET, OTTAWA, ONT.

Be sure to identify the advertisement with Canadian Forestry Journal.

Northern Electric

POWER AND LIGHT



Electric Plants for Every Service
350 to 5,000 watts.

Especially adapted to camps—saw-mills—construction work—stores—farms and all country houses.

This cut shows the Utility model ¾ K.W. usually furnished wtih storage battery, but obtainable as a one-piece generating unit.

Its features include: Bosch Magneto—S.K.F. Ball Bearings—Electric Governor—and concealed Flywheel—it is self-cranking and stops itself when battery is charged.

Northern Electric Company
LIMITED

Montreal Halifax Toronto London Regina Calgary Edmonton Vancouver Winnipeg

Foresters' Equipment

MOSQUITO AND INSECT PROOF TENTS
WATER AND MILDEW PROOF BAGS
FROST PROOF SLEEPING BAGS

ALL "WOODS" QUALITY

Woods Manufacturing Co.

DEPT. D. OTTAWA

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST

DRYDEN, ONT.

Shippers to H.M. Government.

Hill's Seedlings & Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.

Forest Planters Guide Free.

The D. HILL NURSERY CO. Evergreen Specialists

Largest Growers in America.

Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk

The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition Address

W. Smith Grubber Co.

Smith Sta.

LaCrescent, Minn.



ASK EVERYWHERE Eddy's IN CANADA **FOR**



GAGNON & MORISSETTE

TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES

CHICOUTIMI, - - P.Q.

LT.-COL. L. J. D. MARQUIS

Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.; Former Mem. Que. F. Service

Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping

GIFFARD, - - - QUEBEC.

Timber Lands Bought & Sold

Timber and Pulp Wood Estimates.

R. R. BRADLEY

CONSULTING FORESTER

Globe-Atlantic Bldg. - ST. JOHN. N.B.

Timber Estimating & Mapping

Management of Forest Properties.
Supervision of Lumbering Operations.
Forest Planting.

COOLIDGE & CARLISLE

FOREST ENGINEERS

BANGOR - - - - - MAINE.

Timber Estimates

JAMES W. SEWALL Old Town, Maine.

CITIZENSHIP AT WORK!



A Short Statement on the National Purpose Behind the Canadian Forestry Association.



The Canadian Forestry Association is a co-operative union of ten thousand Canadians who believe that the care of the public-owned forest resources is a first duty of their Citizenship.

Of all the resources, the forests are the most easily destructible. Lands, mines, fisheries, water-powers—mighty factors in the national machine—are subject to abuse and deterioration, but none is so exposed to rapid destruction as the forest.

Two-thirds of Canada's forests already have been destroyed by forest fires.

The story of purposeless devastation has applied uniformly from Coast to Coast.

Changing conditions only add to the enormity of timber destruction. As the forest areas decrease, the world's demand for the thousand-and-one products of the forest intensifies. Consider one forest product—the modern newspaper! Forty million newspapers are whirled from the presses of the United States and Canada every working day. A blank newspaper is but a flattened log.

America has to have for her newspapers every twelve months, a pile of spruce logs four feet high and nearly 9,000 miles long.

Small wonder that the industries and Governments have decided to face the question of impending forest "exhaustion" and find a remedy in fire prevention and sane forest management.

Canada is a country of public-owned forest lands. Fully nine-tenths of all the forest lands of the country are in possession of the state. The protection and management of these forest properties so as to keep the great resource self-perpetuating for all time to come is a long-time enterprise. It involves policies extending far beyond the "life expectancy" of any individual and most corporations. For such peculiar reasons, Forest Conservation is primarily a state responsibility devolving upon the whole of the people. The chief burden of forest depreciation and the greater part of the dividends of good handling are assumed by the Canadian people.

YOUR SERVICE TO CANADA.

Then, why the Canadian Forestry Association?

Because in democratic countries, legislation seldom runs in advance of public opinion. There must first be an informed public before there will be genuine forest protection. The Canadian Forestry Association takes upon itself that educational task.

"But," the reader may say, "I am not benefiting by this propaganda—not personally." Neither does the great bulk of our ten thousand members. Forest Conservation is but your synonym for alert citizenship. It is not primarily a technical or trade matter. It is national welfare.

THE MAN WHO SETS FIRES.

"Does the Association reach the man who actually causes the forest fires?"

"That is a question everyone is interested in. We have our lecturers working in various sections of Canada. They use motion pictures freely. We have what are called "Travelling Lecture Sets" for use in the schools and churches. Then our Railway Exhibition Car, a sort of "Forestry School on Wheels," it has gone into most of the provinces with its unique display and daily lectures.

We prepare and distribute free booklets, well-pictured, to tens of thousands of young people. We issue special editions of attractive literature to settlers, railroad men, etc Maybe you have encountered our sermonettes in a cigarette package, or attached to the menu cards of a dining car! They have been used by thousands in such ways.

We place large fire-warning banners at some of the railway junctions, and no doubt you have read numerous of our newspaper and magazine articles sent out by our Publicity Bureau. Then, too, we get a great many business concerns to substitute our fire prevention advertisements for their regular ads in the papers.

"Why not allow the Governments to undertake this work?"

"Eventually they may, but mainly as a consequence of the Canadian Forestry Association's twenty years of propaganda. For the present, much of the Association's effort is expended in persuading some Governments to institute

proper forestry policies. Without the driving force of such concentrated public sentiment, many of the sound and practical laws and improved administration in our Canadian provinces would to-day be lacking.

These are but a few of the methods we use to win the Canadian people to careful guardianship of their forest resources.

FOR 1920 WE WANT

To establish a Resident Secretary in the Prairie Provinces to develop a tree-planting campaign and arouse interest in forest fire prevention.

To establish a Children's Lecturer, working exclusively with young folks in all parts of Canada, and having the aid of motion pictures in all his public meetings.

To intensify all our campaigns of education.

IT DEPENDS UPON YOU.

We have no identity with any Government or commercial body. Every dollar received is a voluntary contribution. The prompt payment of the annual fee is the very best method of keeping our constructive propaganda active.

"We recognize the extremely good work done by the Association, and have pleasure in enclosing our cheque for $50 towards carrying out your programme."—Jas. Richardson Co., Matane, P.Q.

TORONTO FORESTERS AT BANQUET.

Addresses covering a wide range of forestry subjects were delivered at the fifth annual banquet of the Foresters' Club, Faculty of Forestry, University of Toronto, at the Carls-Rite Hotel, February 7th. A. W. Beatty, president of the club, presided, and addresses were given by D. R. Campbell, E. J. Zavitz and E. H. Finlayson. The guests of honor present were: Clyde Leavitt, Chief Forester, Commission of Conservation, Ottawa; D. R. Cameron, Dominion Forestry Branch, District Inspector for British Columbia; Charles MacFayden, Dominion Forestry Branch, District Inspector for Saskatchewan; E. H. Finlayson, District Inspector for Alberta, and E. J. Zavitz, Provincial Forester for Ontario.

WANTED

150 lbs. White Spruce Seed

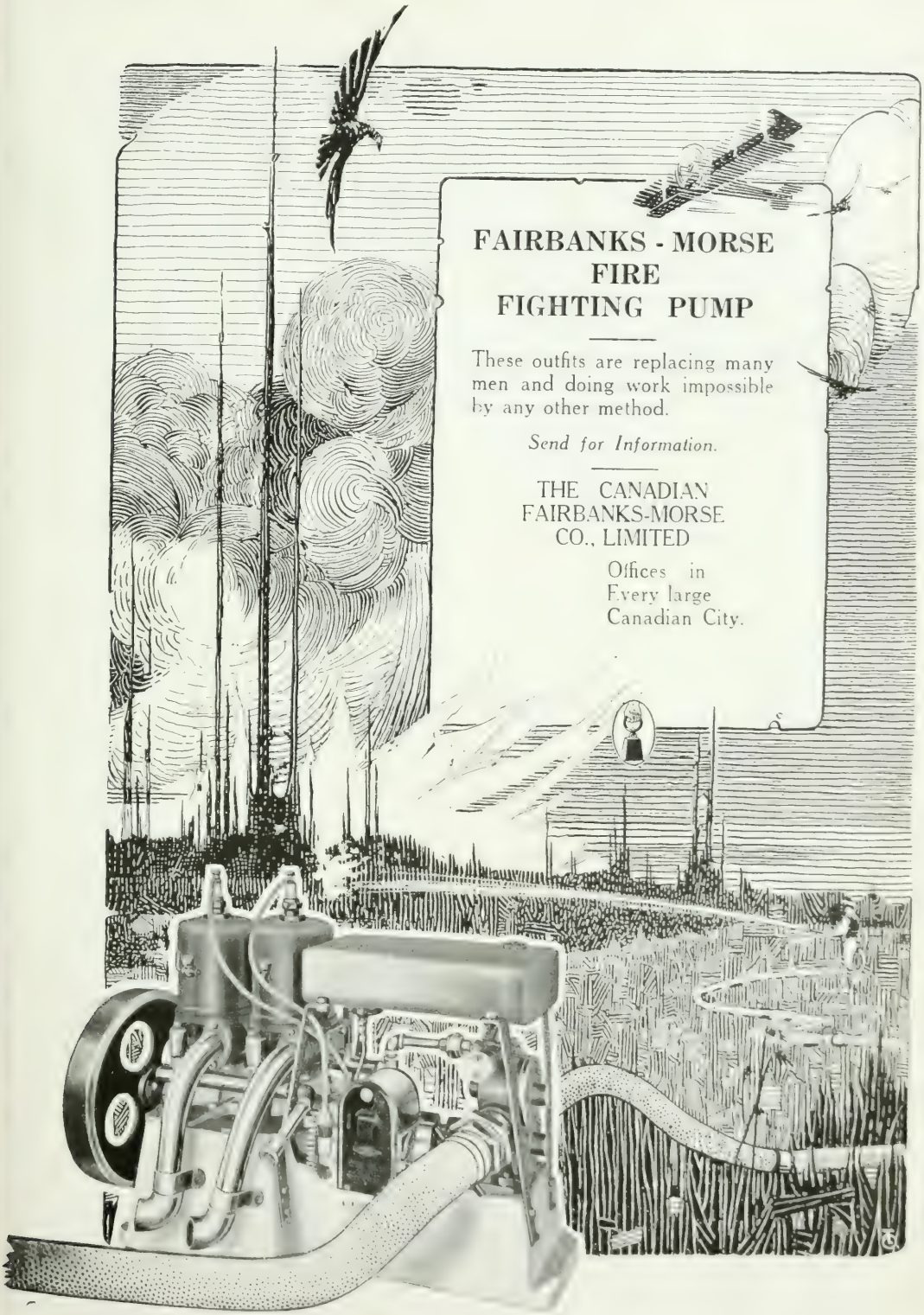
(Picea Canadensis)

LINCOLN WOOD PULP CO.

Box 923 BANGOR, MAINE.

SEEDING IN FURROWS VS. PLANTING

Hegemeister Streck, of the German Forestry Service, in a magazine article, asserts that regeneration of clear-cut areas can be done fully as successfuly by seeding as by planting. He has used a system of strip seeding with excellent results both as to germination and as to survival through dry years such as 1911, 1915, 1917, and 1918. In 1911 and in 1918 the spring droughts were so severe as to kill even ten-year-old pines, while the one to four year old plants in the seeded strips all survived. The 1918 seeding which covered 23 hectares was a complete success. He cleans off the raw humus from strips 50 cm. wide, spaced 1.5 meters apart, and in the middle of the strip makes a furrow 10 cm. wide and of the same depth. This is done in the fall, and early the next spring the seed is sowed in the furrows and covered. Emphasis is laid on the need for carefully removing all of the raw humus, and for sowing the seed early so as to take advantage of the winter moisture.


FAIRBANKS - MORSE
FIRE
FIGHTING PUMP
These outfits are replacing many men and doing work impossible by any other method.
Send for Information.
THE CANADIAN
FAIRBANKS-MORSE
CO., LIMITED
Offices in
Every large
Canadian City.

HIBBERSON BROS.
FOREST ENGINEERS and SURVEYORS

Cruising, Mapping, Logging Costs, Flumes, Rogging R.Rs.

Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.

Fifteen years experience cruising British Columbia Timber.

Suite 701-5 Belmont House, Victoria, B.C.

QUEEN'S
UNIVERSITY
KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL NAVIGATION SCHOOL
July and August. December to April
26 GEO. Y. CHOWN, Registrar.

LUMBERMEN ATTENTION!

Investigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for booming swift running rivers where logs are held.



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

A. E. LOOSEN,
BATHURST, NEW BRUNSWICK

WHAT IT COSTS TO CLEAN UP A FOREST

(Continued from page 86)

big ends in one direction everything is burned, and allows the burners to proceed with the fellers. There are two main difficulties in this way:

1. The opposition of the men doing the work, even though desired by their superiors.
2. The present system of placing the men.

These are more serious problems than would be supposed. Good men are scarce, and they object to the heat and sparks from the fires. Therefore, the poorer workers drift into a job they cannot handle properly. However, this can be overcome by piece-work, with a bonus and proper supervision.

Cost. This cost has been obtained from the time reported as work done by the men on the job. However, the costs were kept separately for each strip ,therefore we have been able to obtain also a comparative cost on same. For obtaining the number of cords, the logs were measured at the mid-diameter, 4,000 logs on the burned area being measured, and the result used as a converting figure. The Quebec rule was used in obtaining the board measure.

The following has been compiled from the actual time recorded against the operation. A daily time sheet shows for the whole operation:



Before the brush was burned on one of the Laurentide Company's experimental strips.

40 man days at $3.10	$124.00
2 man days at 2.70	5.40
1 man day at 2.50	2.50
Board at $1.25 per day	53.74
	$185.64

They have burned 15 acres on which there were 172.1 cords of wood, or 84,775 B.M. Therefore, the cost per cord is $1.07, and the cost per M., $2.18.

Mr. Lyons' figures further showed that on one strip of five acres, felling and limbing cost $2.94 per cord, with 89 cents per cord additional for piling and burning. A second strip of five acres showed a cost of $1.11 per cord for brush disposal.

As to the time check kept on the operation, Mr. Lyons stated that the periods accounted for included the time spent in actually piling and burning the brush. It was found that it took one man one hour to pile the brush from seven trees averaging 8 inches stump diameter. Therefore, in measuring the same, computing into cords and at the wages paid, the result was 87 cents per cord.

B.C.'S CUT FOR 1919.

Victoria, B.C.—The total log scale for the province for the year 1919 is 1,758,329,995 feet, as compared with 1,761,184,406 feet in 1918, according to a statement issued by Hon. T. D. Pattullo, Minister of Lands.

COMING B. C. LEGISLATION.

"It is also foreshadowed that a measure will be brought down looking to the conservation in perpetuity of the timber of the province, and the Legislature will be asked to grant a special appropriation in this connection. Irrigation conditions in the dry belt will again be considered with the object of providing for a more thorough system of protection to the water service generally in the districts affected. In this respect the minister of lands will introduce a comprehensive proposal for the consideration of the House."

—*Vancouver Province.*

BARK BEETLE MENACE AT COAST.

War has been declared by the B.C. Forest Branch on the pine beetle which for years has been carying on its destructive work in certain sections of the interior of the province.

Mr. Ralph Hopping, an entomologist, who has had wide experience in fighting the pine beetle on both sides of the international boundary, has been loaned by the Entomological Branch of the Department of the Interior at Ottawa. He is now on the ground directing operations for the curtailment of the energies of the beetle, and, it is hoped, for its ultimate control.

B. C.'S STAFF REORGANIZED.

The British Columbia Forest Branch has recently undergone a complete rearrangement of its administrative organization, which will enable it to handle its large volume of work more adequately, and render better service to the public, than ever before. The return of the great bulk of its technically trained forestry staff fro moverseas service, coupled with the acquisition of some new men, has rendered this progressive action possible.

In recognition of valuable services rendered, as well as of increased living costs ,the salary scales have also ben revised upward in a way that will set the standard for other governmental forestry organizations throughout Canada.

One of the features of the administrative reorganization is the establishment of an office of investigations, whose duty it will be to conduct studies and researches into the various problems connected with the administration of Provincial Crown timber lands. This will include growth studies, volume studies, regeneration surveys, methods and costs of slash disposal, etc.

The Forest Branch has full charge of all phases of Crown timber land administration, including not only fire protection, but the enforcement of timber regulations, scaling, collection of forest revenue, grazing and the development of domestic and foreign trade in British Columbia timber. The forest revenue to the province aggregates upwards of $2,700,000 per year and is now to be further materially increased, due to the enhanced selling price of lumber, upon the basis of which stumpage prices for timber cut on Crown lands will be increased, in accordance with the Forest Act.

CLYDE LEAVITT.

B. M McGRATH

Colonial and Industrial Investments,
Timber, Pulp Wood Areas and
Waterpowers.

Newfoundland and Labrador
Mines and Minerals.

Reports, Plans and Estimates Furnished

TRADE REVIEW BUILDING,
ST. JOHN'S, NEWFOUNDLAND

THE UNIVERSITY OF TORONTO

and

UNIVERSITY COLLEGE

WITH WHICH ARE AFFILIATED

ST. MICHAEL'S, TRINITY & VICTORIA COLLEGES

Faculties of

ARTS MUSIC MEDICINE
EDUCATION APPLIED SCIENCE FORESTRY

Departments of

HOUSEHOLD SCIENCE SOCIAL SERVICE

For information, apply to the Registrar of the University, or to the Secretaries of the respective Faculties.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING.

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"

RSC
INVESTMENT - SERVICE

Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities Corporation Limited

MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG.

FACULTY OF FORESTRY
APR 6 1920
UNIVERSITY OF TORONTO



Canadian Forestry Journal

March 1920

THE MAPLE SUGAR SEASON



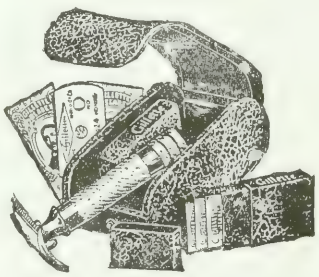
Field, Stream and Road

How strange the old-time pictures of sport would look today—baseball teams boasting at least half-a-dozen sets of whiskers—full-bearded cricketers—champions of the scull with their chins concealed.

Today the athlete knows the importance of the well-shaven chin. He is conscious that he is most keen when he is well-groomed—just as is the business man and the soldier.

For men who love outdoor life and sports, men of virile minds and active bodies, we have designed a Gillette Safety Razor with an extra stocky handle—the "Bulldog" Gillette, shown to the left.

Not that the Gillette needs a sturdy grasp. A light touch, with the angle stroke, removes the most stubborn beard with surprising comfort.



The "BULLDOG" Set includes oval Morocco Case with two blade boxes to match, and 12 double-edged blades.

But there is a certain appeal in the thicker handle of the "Bulldog". Ask to see this special set and appreciate the point for yourself.

The case, you will notice, is almost as compact as the famous Pocket Edition Gillettes, and the price is the same, $5.00.

Sold by all dealers catering to men's needs.

MADE IN CANADA

TRADE Gillette MARK

KNOWN THE WORLD OVER

Gillette

Safety Razor

573

CIRCULATION: 11,500 COPIES MONTHLY ROBSON BLACK, EDITOR

Canadian Forestry Journal

VOL. XVI. OTTAWA, CANADA, MARCH, 1920. No. 3

Why the Price of Lumber?

By Robson Black

A Statement of Fact Concerning Changed Conditions in Lumber Manufacture Since 1913

To many a prospective lumber purchaser there seems a disheartening discrepancy between what looks like an abundance of trees in the forest and the amount of money demanded of him for 5,000 feet of serviceable boards. If logs were lumber, the price might indeed be sliced off many per cent., but trees and logs are merely one factor in production. The conversion of trees into merchantable products requires a very unusual application of expensive manual labor, and this factor alone is capable of accounting for the greater part of the lumberman's troubles and greatly increased expenses of producing his goods.

5,000 Men Missing.

Perhaps the fact that may impress the lumber consumer most emphatically is that since the declaration of war and the heavy enlistment from the ranks of Canadian woodsmen, more than 5,000 skilled workers in Eastern Canada alone, highly essential to the conduct of the lumber industry in this section, have been lost to their former employment, mostly through seeking easier and more congenial jobs in towns and cities. The deterioration of man power in Canadian woods operations has been most marked. Years ago a gang commonly accounted for eight to ten thousand feet, board measure, in a day's work. Today a gang of the same numerical strength will not average half that production. There is a series of costly discrepancies also in the accuracy with which they do their work, so that the old-time skill and economy in turning a stand of timber into the maximum number of merchantable units is not today commonly in evidence. This depreciation in personnel is a development that the Canadian lumberman would go far to remedy, for it adds immeasurably to his worries, and, of course, reacts upon the market price of lumber products.

Inefficient Workers.

It has become a common saying today that timber cutting has changed from a one-gang system, to a three-gang system, the latter referring to the consequences of industrial unrest whereby quite frequently, while one gang is at work producing logs, another gang is going in to take its place and a third gang of disgruntled men is coming out. As a general figure, it is probably safe to say that coupling quality and quantity of work per day, the bulk of shantymen (in Ontario and Western Quebec at all events) are not above 50 per cent. efficient as compared with the standards of, say 1913.

The shiftlessness of such a large proportion of present-day lumberjacks is perhaps not very difficult to account for when one considers that 5,000 of the veteran workmen, who previously gave stability to the labor market, have quit their old employment and have left the jobs to a like

number of uninitiated workmen. To the latter class, shanty work lacks a good many of the social amenities of the town and city, and a few weeks restless employment is apt to make such a man give a willing ear to the camp agitator.

Labor Unrest.

Another interesting and vital fact taken from the 1919-20 experience of lumbermen in the Ottawa valley and in varying degrees over other parts of Eastern Canada, is that in the average camp that should have a staff of 80 to 100 men, labor unrest often results in stripping the camp of half its complement at the period of the year when production should be highest. The reader will bear in mind also that the fixed overhead charges remain about the same whether the woods operations are going at full blast or under a half crew. Foremen, superintendents, bookkeepers, and clerks must be held on the job and the cost of supervision itself has materially risen. At the sawmill end, also, the reduced hours of labor and advance of wages of from 80 to 100 per cent. between 1913 and 1920 bear upon the cost of lumber in the retail yard.

Feeding the Lumberjack.

The wages paid to shantymen always are in addition to board and lodging. Here we come upon yet another factor that helps to add dollars to the market price of a thousand feet of spruce or pine. Comparing the wholesale prices in 1913-14 and 1919-20 at Ottawa, the four big staple items of food have advanced approximately as follows:

Flour from $4.80 per barrel to $13.30.
Oats from 45c per bushel to $1.00.
Hay from $15.00 per ton to $30.00.
Pork from $23.00 per bbl. to $48.00.

Plant and equipment, as between the six years mentioned, show an increase of 150 per cent. Blankets, which were $4.50 a pair in 1913 are now $12.50 to $15.00 a pair.

Wages have increased 120 to 140 per cent. In 1913, wage rates in the woods ran from $28 to $30 a month, and today are from $65 to $80 a month plus board.

Freight Rates Also.

Another factor directly increasing the cost of lumber to the consumer has been the advance in freight rates by the railway companies. First came an advance of 15 per cent. with a maximum of one cent per hundred pounds, then a further scaling up of 25 per cent., with a maximum of 5 cents per hundred pounds.

It is well also to bear in mind that the popular notion that lumbermen obtained their limits for "a mere song" and are cashing in on a piece of good luck and government generosity, is not borne out by facts. The "mere song" may run into scores of thousands of dollars, and no investment in the world is so constantly exposed to depreciation through forest fires as is true of a timber limit purchase in most parts of the Dominion. Except for a small area in the Eastern States there is as yet no such thing as timberland insurance against destruction by fire. It is the purpose of the Forestry Journal in an ensuing number to explain some of the facts associated with timberland tenure in Canada, from which it will be seen that, except for a relatively small percentage, the great bulk of the timberlands now under operation represent a large capital investment with heavy carrying costs.

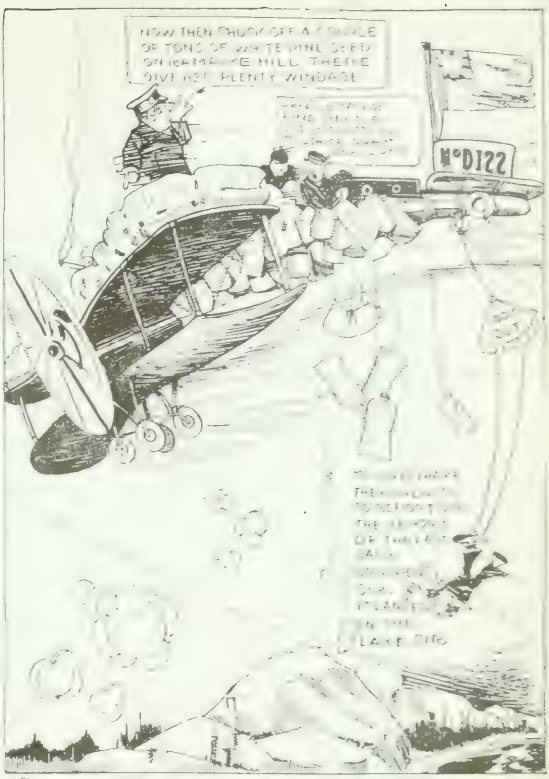
PLANTATION OWNER!

Exact data regarding small plantations, their costs and profits, are very meagre. The Canadian Forestry Journal invites its readers, many of whom own tree plantations, to place before the membership whatever facts are available.

We would like to secure information particularly of those plantations now yielding fuel wood or other commercial material. Will you aid us in this search? It may be possible to arrange for expert studies to be made of a few of the more interesting examples.



A WESTERN GOVERNMENT HAS BEEN ASKED BY AN ENTHUSASTIC INVENTOR TO STOP FOREST FIRES BY SPRINKLING THE CLOUDS WITH SALT THERE BY PRECIPITATING RAIN —



— Someone Has Seriously Proposed Protecting Canadas Forest areas If "" be done by Aeroplane —



The Employment of Gas Bombs to Extinguish Forest Fires is Frequently Put Forward



Carrying Fire Fighters to a Forest Fire by Aeroplane May Become a Reality

The usefulness of the aeroplane in forestry is now so surely established that our artist has taken a few liberties with the radical suggestions making their appearance in the daily press from 'Vox Populi' and 'Constant Reader.'



DOES THIS LOOK LIKE HARDSHIP ON THE "BALD PRAIRIE?"

Tomato plants bending under luscious fruit; mammoth melons and other delectable products are regularly produced on the Brooks' Demonstration Farm in Southern Alberta. How? Two reasons, mainly: water, and shelter belts of trees The shelter from prairie winds is absolutely essential, and in this instance the value of the laurel-leaf Willow has been splendidly demonstrated The water is taken from the Canadian Pacific irrigation system.

Successful Tree-Growing on Prairies

By Norman Ross

Chief of the Tree Planting, Dominion Forestry Branch, Indian Head

Tree culture will, without doubt, eventually hold a very important place in the future agricultural development of the prairies. The desirability of encouraging tree growth in such a country as this is very evident, but naturally time is required to produce any very noticeable results over such an immense tract at present practically destitute of tree growth.

Natural conditions as we find them are not particularly favorable to tree growth, and success can only be attained by the expenditure of a considerable amount of labor, which, however, will be amply repaid by results, and the adherence to certain main principles as to cultivation and choice of varieties which experience has demonstrated as essential.

The success of tree culture depends upon two things, namely, cultivation and the choice of varieties known to be hardy. Cultivation is required to put the soil in the proper physical condition, first so that the tree roots may become properly established, and second to form a reservoir for the storage and conservation of moisture. The necessary cultivation consists of as deep a ploughing as practicable, loosening up the soil to the greatest possible depth, and at the same time rooting out all native growths of



WHAT CANADA'S PRAIRIE FARMS CAN DO UNDER PROPER CONDITIONS.
This great crop of onions on the Brooks' Demonstration Farm in Southern Alberta, is the product of the irrigation system of the Canadian Pacific Railway, plus shelter belts of trees. The trees provide essential protection against blighting winds.

grass. weeds, etc. In most cases the tendency is to give insufficient preparation to the soil before planting, and this is nearly always fatal, and by far the greater percentage of failures can invariably be traced to this cause. When a settler once decides to plant trees he generally wants to see results in the shortest possible time, and for that reason, unless he should happen to have a piece of land which has been under cultivation for some time, is seldom willing to postpone the actual planting in order to put the ground in better condition, as he imagines that by so doing he is losing valuable time, whereas he is as a matter of fact inviting failure and practically throwing away valuable time and labor. Our experience in connection with the tree planting work of the Dominion Forestry Department, covering a period of the last sixteen years, in which we have been instrumental in establishing thousands of plantations in the three prairie Provinces, has proved conclusively that thorough summer fallowing, taking one year with another, is the only preparation that can be absolutely relied upon. If following such preparation, suitable varieties are selected and properly planted, success is bound to follow providing reasonable protection from stock, fire, etc., and cultivation are subsequently given to the young plantations. Cultivation after planting is as necessary as before, as on account of our soils being very rich, weeds and grass will quickly work in among the trees if not carefully looked after. Grass is the worst enemy of established tree belts, and nearly always works in from the edges unless proper measures are taken to prevent it. Once grass gets



Part of the shelter belt of Laurel leaf Willow on the Brooks' Demonstration Farm in Southern Alberta, together with the irrigation lateral.

a good foothold in a plantation it is only a matter of time in most cases until the trees gradually die out. There is not sufficient precipitation to support a growth of grass and trees on the same piece of ground. This is a point which must be fully realised, as it is the whole secret of success. We have never yet seen a failure where proper methods of cultivation have been intelligently carried out.

To be successful in tree-growing requires patience and perseverance, as one is certain to meet with many discouragements. One season it may be damage from insects, next winter-killing, then hail or perhaps rabbits may destroy the whole of a young plantation a year or two after the trees are set out. However, such setbacks are generally only of a temporary character, and probably the majority of planters will largely escape such disasters. But even should one's trees be occasionally more or less injured by winter-killing, which is perhaps the most serious of our difficulties, that is no more reason for giving up tree culture than for a farmer to stop growing grains because his crop is once in a while destroyed by frost.

A well-established and properly arranged system of tree belts is an enormous asset to any farm. We have in our office hundreds of letters from farmers who place the value of their belts at very large figures, running from some hundreds of dollars to, in many cases, three or four thousand. At present few farmers plant trees with a view to the ultimate value of the wood products. The first consideration is always to provide shleter and improve the appearance of the homestead. Only those who have lived on the open prairies can realise just how much such shelters add to

their comfort and convenience. In the summer time a properly sheltered garden makes it possible to produce as fine vegetables, flowers, berries and bush fruits as can be grown in any part of Canada, and although we do not predict that Saskatchewan will ever be noted for her commercial orchards of tree fruits, there is already ample evidence to show that standard apples and certain varieties of plums may be grown with a considerable degree of success for home consumption. It is only a question of the development and propagation of varieties suited to our conditions. In the winter time the shelter belts give protection from the sweeping winds and are of very practical value in holding back the snow from around the buildings. This in itself is worth a very great deal, as any one will realise who has to dig his way morning after morning, through deep drifts before the stable doors can be opened.

From an æsthetic point of view, the building up of the home, and the influence on children, the importance of tree culture cannot be over-estimated. In fact in such a country as this it is doubtful whether such beneficial influences do not far exceed any intrinsic worth or money value that can be produced in actual wood materials.

That there is no difficulty at all in growing fuel supplies and fencing materials on the prairies in a comparatively short time has been amply demonstrated, but it will be many years before individual farmers are likely to seriously consider this phase of tree culture.

Short Facts about Canada's Paper Industry

While the bulk of Canada's pulp and paper exports go to the United States, they are also sent to Great Britain, Japan, China, Australia, New Zealand, South Africa, India, Cuba, Mexico, British West Indies and South America.

Canada's pulp and paper exports lead all manufacturing industries.

The United States consumes one-half of the world's production of paper. Canada, in proportion to her population, is a close rival of the United States as a paper-consuming country.

The newspapers of the United States consume 2,000,000 tons of newsprint every year, of which Canada supplies, approximately, one-fourth.

The daily consumption of newsprint paper in Canada is, approximately, 250 tons; in the United States, 5,750 tons.

Where coal is used to generate power in the operation of paper mills it takes, approximately, a pound of coal to produce a pound of paper.

Paper was first made in Canada at St. Andrew's, Que., in 1803.

Canada's first large paper mill was built in 1865, and produced 1½ tons of paper in 24 hours. Today a modern paper mill produces from 250 to 300 tons in the same length of time.

Canada's pre-eminence as a paper-producing country lies in the possession of thousands of acres of pulpwood forests conveniently located to water powers.

Canada has the largest forest area of any country in the British Empire.

Canada's daily output of paper, made into a continuous strip three feet wide, would be long enough to girdle the globe at the equator.

The principal pulp and paper mills of Canada are located in the provinces of Quebec, Ontario, New Brunswick, Nova Scotia, and British Columbia.

Spruce, balsam fir, hemlock, jack pine, tamarack ,poplar and bass-wood are used in the manufacture of pulp.

Quebec's annual production of pulp wood exceeds 1,000,000 cords. Ontario comes next with about 800,000 cords.

It takes approximately 1½ cords of wood to make a ton of paper.

The Maple Tree as a Profit Maker

By Dr. George Fisk, Montreal
Proprietor of Maple Glen Reserve, Magog, P.Q.

The only natural forest tree in Canada which may be cropped while it is slowly growing to maturity for lumber is the maple tree. This may be tapped with profit for the production of maple sugar after it has grown to the size of six or eight inches, and so provide a revenue long before it is large enough to give the best returns as lumber. In twenty-five or thirty years after a tree the size of a broom handle has been transplanted, it should yield a very profitable return for the time and money invested.

The most suitable locations in this Province of Quebec for maple groves are along the ridges and hillsides and it is not difficult to find many hillsides gradually sloping, which have been cleared or partially cleared, and are now grown up to thickets of hardwood, in whichc maple largely predominates. Mr. R. H. Campbell, Director of the Forestry Branch of the Department of the Interior, concludes an interesting comparison between the pine tree and the maple tree as follows: 'When one considers the revenue derived after the thirtieth year from the sap, and the higher prices obtainable for thinnings as fuel, or making acetic acid, wood alcohol and charcoal, there seems but little doubt that the maple would in the end be the more profitable tree. This is particularly true in the case of the small wood-lot owner, or farmer, who has many uses for the wood, and especially



Pouring pure Maple Sugar cakes in a modern Quebec factory.

where the maple already exists in the stand and natural reproduction can be secured.'

Let us examine this problem of a maple orchard ideal in location, arrangement and outfit for producing maple sugar of the highest quality at the lowest possible cost. To produce an article economically is, of course, to produce it in fairly large quantities. It is, therefore probably wise to develop as large an area as possible in one sugar orchard. The chief expense in administering a sugar orchard is in gathering the sap from tree to tree. The quickest and most economical method of doing this is by gravity through a system of pipe lines. The orchard preferably should be placed around a sloping hillside, not too rough or steep for the necessary road where teaming is needed, and this entire slope should focus at some point lower down, where the sugar cabin and storage tanks should be placed.

It is not difficult to find in this Province of Quebec many suitable areas in which more than 30 or 40 acres of hillside are tributary to a suitable point for a sugar cabin. If we take, then, for illustration, a unit of thirty acres, sloping preferably to the east or southeast, we would in time be able, by proper planting, to vhae an orchard of 4,000 trees or more, estimating 133 trees per acre. This should mean 4,000 buckets, or, perhaps more if some trees are large enough to permit of more than one bucket. If this area contains maple trees already, it simplifies the undertaking very much, as it will not be necessary for the owner to wait twenty-five years for the full maturity of his orchard. If the other varieties of wood are first cleared out, and the vacant places filled by planting young maples where necessary, the orchard will go on improving year by year.

In considering the economical administration, small subsidiary cabins should be built at convenient points to allow for the storage of tanks, covers, spouts and piping, each cabin



Mr. C. E. E. USSHER
President of the Canadian Forestry Association.

to contain from 500 to 1,000 buckets. This facilitates tapping in the early spring, when the snow is deep and the transportation is difficult. With a system of two-inch galvanized sheet iron pipe in ten ft. lengths, which can b eplaced in position on a series of posts, or suspended from a line of barb wire, so as to be easily taken up after the season is over and stored in the cabin, all long hauling of sap is obviated. The collector of sap, with a neck yoke and two pails, gathers the sap from tree to tree, and empties it at pleasure into the nearest pipe by means of a connecting hopper. The sap flows direct to the storage tank, and the collector wastes no time in needless journeyings to the storage tank. With a complete line of piping, it is never necessary for a collector to travel more than a few yards before emptying his load. A good man should be able to gather all the sap from 600 to 800 trees each day in this way.

It is very important that the evaporating outfit should be ample



Employing pipe lines to carry the maple sap to the evaporator.



The old-fashioned way of maple sugar making.

for the size of the sugar orchard. We see all too frequently small evaporating accommodation, necessitating much overtime work. The largest evaporator at the present time on the market is a 6 ft. x 24 ft. This is not at all unwieldly, and can be operated by one man with little more trouble than one of one-fourth the area. In most sugar orchards this size should be ample for an orchard of 4 000 trees, by providing a night shift for boiling. The next point is to provide large buckets, covers, and satisfactory spouts to give the best possible returns from each tree tapped. It is a frequent observation that small buckets waste one-half of the sap which flows, and that uncovered buckets in rainy weather waste nearly all the sap.

It has been estimated that about 9% of the sugar content of the maple tree is obtained from a single tapping. It is also an opinion of experts that if 20% could be obtained no damage would be done to the tree. If some way is devised by which an increased flow could be obtained it would increase the commercial returns materially.

In administering a sugar orchard it is a well known fact that if the orchard is concentrated over a small area it is much more economical than where the trees are wide apart. Careful reforesting of the barren areas in the orchard will, in time, give an ideal orchard for economical administration.

There are many points in the cabin and woodshed which may be adjusted for economical administration. A large evaporator will frequently absorb three cords of wood during the day. This is a lot to bring in by the armful. An overhead rail from the woodshed with a truck suspending platform will simplify this very much. There are many other similar points of economy which we will not mention.

Let us estimate, then, the results at the end of twenty-five years after careful reforesting that one would expect to obtain. With an area of thirty acres, averaging 135 trees, or 135 buckets to the acre, and one large evaporator ,it would be possible for six men to administer this with comparative ease. The average annual return should be about two pounds of sugar per tree, or one gallon of syrup to five trees. If a high quality of sugar and syrup were made, as it should be under these conditions, a high price should be obtained for the product.

The labor problem, of course, is a very important factor in any estimate of this kind, but the sugar season is a quiet one with those who work on the farm and in the lumber woods, and with proper accommodation for the men, preferably in the sugar orchard itself, it should not be difficult to provide and retain adequate skilled labor. To many a farmer who has a wood-lot and taps a few trees that nature has given him, the return is not arge for the labor, but the same thing prevailed in the apple industry, when the farmer attempted to sell a few seedling appes from accidental fruit trees about the fences and clearings. To-day select orchard lands are planted, drained, cultivated, and carefully tended, and I am free to say that, considering the initial cost of suitable apple tree land, and the subsequent expense of planting and caring for the orchard, the return is not greater, nor the investment more secure, than would be a maple orchard well located and well administered. Furthermore, much of the land suitable for maple trees is quite unsuitable for fruit trees, and young maple trees are found on every hand ready for panting, and require no spraying or cultivating. The necessary capital to plant a maple orchard is far below the amount required to plant a fruit orchard.

1,000 SPEAKERS ON PROTECTION OF THE FORESTS.

The Canadian Forestry Association has under formation a Speakers' Bureau, by which selected speakers in 1,000 communities will deliver addresses to school children and other gatherings on forest protection and kindred subjects. School boards are co-operating with the enterprise.

The Maple Sugar Industry in Canada

The making of maple sugar and syrup has become but a memory in the recollection of residents in many of the older parts of Canada where even the woodots have given up their places to cultivated fields. The industry is still, however, an important one over large areas in Quebec, and to a less extent in Ontario and the provinces down by the sea.

Sugar making from the maple, which is confined entirely to this continent, had a very early beginning. Before the advent of the white man the Indian had learned to extract and concentrate the sap of the maple tree. On the approach of spring the trees were gashed, with the tomahawk, in a slanting direction and beneath the opening made was inserted a wooden chip or spout to direct the fluid drop by drop into the receptacle resting on the ground. The sap was caught in a birch dish and boiled in earthen kettles. The small quantity of dark, thick syrup this made, was the only sugar available to the Indians, and is stated by early writers to have been highly prized.

The early settlers from the Old Land learned from the Indians the art of sugar making, and indeed followed for many years their crude methods of manufacture. Even yet primitive equipment and methods are stated to be used in back sections of the country that turn out their annual crop of dark, inferior syrup and sugar.

For perhaps a century the white man followed very closely the primitive methods of the Indian, save the substitution of iron or copper kettles for vessels of clay or bark. In the early days before the timber acquired much value the axe continued to be used for tapping the trees, the cap was caught in wooden troughs and conveyed in buckets on the shoulders with a sap yoke to a central point to be boiled. No sugar bush was fully equipped without snowshoes, which were frequently found necessary in gathering the sap. The boiling was done in arge iron kettles suspended from a pole in the open woods in a sheltered location with no protection from the sun, rain or snow or the ashes, falling leaves, moss and bits of bark that were driven about by the wind.

The maple products made by this crude method were strong in flavor, dark in color and variable in quality.

Until about fifty years ago there was little improvement made in the methods of sugar makers; but since that time the advance has kept pace with that in other branches of agriculture until it has become a more or less highly organized commercial industry.

An early improvement was the substitution of the auger for the axe in tapping, coopered buckets took the pace of the birch bark "caso" or hewn sap trough, while the kettle gave way to the evaporating pan, which has, in latter years, developed into the modern evaporator with corrugated bottom and separate compartments. Not alone for the conservation of the life of the tree, but also for the cleanliness in sugar making, the wooden spout has almost disappeared in the most advanced sections, in fact the ntendency now is toward the use of metal in every article of equipment with which the sap, syrup or sugar comes in contact. Furthermore, the increasing cost of

labor is being met by the ingenious inventor, who has provided facilities for taking full advantage of the law of gravitation in handling the fluid which in a well equipped plant flows of its own accord from the collecting tank to the storage vat, from thence to the evaporator and, when boiled to a proper consistency, into the receiving can. Indeed where the profile of the sugar orchard will permit of it, pipe lines are laid to conduct the sap from outlying collecting centres to the camps where evaporation takes place.

With all the advance that have taken place in manipulation, sugar making has not lost its romantic side. "Sugaring Off" at the sugar camps in the woods is still looked forward to by young and old, who regard the event as a social feature affording rare enjoyment. The tramp to the woods on a spring day, the aroma of the escaping steam, the partaking from a wooden paddle by means of a chip-like scoop, the hot syrup just on the verge of solidifying into sugar, or the tasting of the "wax" that has been allowed to harden on the clean snow, all serve to inspire the reminiscent story teller and to awaken the amorous instincts of the budding youths. Such was the sugaring off of decades ago and such it is today, where sugar orchards are operated for from two to four weeks in the spring in certain sections year after year.

—J. B. SPENCER.

Extent and Importance of Maple Sugar Industry

The importance of the maple sugar industry is scarcely realized in many parts of Canada where it has long since ceased to be carried on. From 1850 to 1890, according to Dominion statistics, the production of maple sugar together with its equivalent in syrup ,increased year by year. The average yearly production from 1851 to 1861 was about 13,500,000 lbs.; from 1861 to 1871 about 17,500.000 lbs.; from 1871 to 1881, 19,000,000 lbs.; from 1881 to 1891, an average of 22,500,000 lbs. was reached. During the next decade the yearly average fell to some 21,200,000 lbs.

In 1919, however, Quebec Province alone produced about 30,000,000 lbs., valued at 25 cents a pound, making a total of $7,500,000. In 1911, Quebec's maple crop was about 10,000,000 lbs.

The industry is confined in Canada to Quebec, Ontario, New Brunswick and Nova Scotia. In the Maritime Provinces the yearly output has rarely exceeded half a million pounds, and Ontario, 5,000,0000 lbs. per year.

It is estimated that this vast industry is carried on by about 55,000 growers. While many of these operate their larger or smaller woodlots preserved upon their good farms, a vastly larger number take their sap from rough and stony areas that would have comparatively little value if the trees were removed. The increasing value of maple wood and the comparatively low price of maple sugar and syrup, due to former unfair conditions in the trade ed to the removal of many fine sugar orchards that had produced crops of deliciousness yearly for most of a century. It is regettable that the sturdy kings of the maple forest have been cleared off in this way as an important yearly revenue at a season when badly needed, has been cut off, and one which is secured by the labor of a few weeks when it can best be spared from service on the farm. The conservation of the maple groves will, therefore, appeal to every one interested in the forest and the farm.



A block of 70,000 Caragana trees in the C.P.R. Nurseries at Wolseley, Saskatchewan. These are in their third season and were developed from seed.

Horticultural Work of the Canadian Pacific

By F. A. W. Boyd, C.P.R. Forestry Branch, Wolselsey, Sask.

The Canadian Pacific Railway in the past fourteen years has been planting on its Western Lines, large numbers of trees, as snow fences on the right-of-way, and for ornamental purposes in the station gardens.

A large number of the snow-fence plantations have done well, and are taking the place of the unsightly wooden snow-fences; but in a few cases where the locations of the plantations are very high and exposed, the trees have not survived. The varities used for this work have been the willows, Russian poplar, Manitoba maple and caragana. During the last few years some spruces have been planted as an experiment, and in some locations are doing well. It is the intention to make more use of the evergreens in future wherever conditions are favorable.

Outside of the many gardens planted and looked after by station agents and other employees, there are a large number of station gardens which are in charge of professional gardeners under the supervision of a horticulturist, who is on the staff of the Forestry Branch. In these gardens it is the aim to have a good lawn, several good specimens of the different varieties of trees suitable for the locality, a few ornamental shrubs and some good groups of perennial flowers. In some of the gardens annual plants also are used. These gardens not only serve to beautify the station grounds and afford some relief to the eyes of the travellers passing through, but serve as an example and an inspiration to the farmers and settlers, showing what can be accomplished in the way of home decoration and protection, and giving some idea of the varieties suitable to the locality.

An educational campaign is carried on from the office of the horticulturist among the company's employees, the object being to arouse interest in tree planting and allied horticultural activities. A series of bulletins have been prepared and are distributed extensively, dealing with the planting and growing of trees, ornamental shrubs and plants, fruit and vegetables. Trees and other nursery stock are also supplied to employees living on company's property who wish to have gardens round their houses. This work is meeting with great success, and an increasing number of employees avail themselves of these opportunities yearly.

The trees for all this work are supplied from the C. P. R. nurseries at Wolseley, Saskatchewan, which is

situated on the main line sixty miles east of Regina. Here the company's horticulturist makes his headquarters and supervises the nursery work.

These nurseries were established in the fall of 1907 when about thirty acres adjoining the town were chosen, and the ground broken. This area was sufficient for the first few years, but as the work increased and more stock was needed, it was necessary to acquire more land, and an additional seventy acres adjoining the original nursery were fenced, making the total area about one hundred acres.

The climate limits to a great extent the varieties of trees and plants grown. Only three coniferous trees are used to any extent, namely, white spruce, Scotch pine and tamarac or American larch. These are all quite hardy and do well. Among broad-leaved trees the Manitoba maple, green ash, elm, Russian poplar and several willows are the most useful. The list of ornamental shrubs is not long, but includes some very good kinds, such as honeysuckle, caragana, amorpha, Japanese rose, Ginnala maple, sand cherry, dogwood, and several varieties of spirea and lilac. Herbaceous perennial plants are very



A corner of the C. P. R. station at Moose Jaw, Sask. This garden is about seven acres in extent.



Is this result worth while? The station grounds at Virden, Manitoba, are an excellent introduction to the town.

useful in the gardens, and very much in demand. There are about thirty sorts which are hardy, but quite a lot of experimental work is being done, and this number is being added to from time to time as other varieties are discovered which will live on the prairies.

Producer and Customer in Biblical Times

Geo. H. Montgomery, K.C.,

before 1920 Annual Meeting of Canadian Pulp and Paper Association

"The text I have chosen is from 1st Kings, verses eight to twelve:

"'And Hiram said to Solomon, saying, I have considered the things which thou sentest to me for, and I will do all thy desire concerning timber of cedar, and concerning timber of fir.

"'My servants shall bring them down from Lebanon unto the sea; and I will convey them by sea in floats into the place that thou shalt appoint me, and will cause them to be discharged there, and thou shalt receive them; and thou shalt accomplish my desire, in giving food for my household.

"'So Hiram gave Solomon cedar trees and fir trees, according to all his desire.

"'And Solomon gave Hiram twenty thousand measures of wheat, for food for his household, and twenty measures of pure oil: thus gave Solomon to Hiram year by year.

"'And the Lord gave Solomon wisdom, as he promised him; and there was peace between Hiram and Solomon, and they two made a league together.'

"That chapter is not only of interest in discussing the earlier description of the logging industry, including the drives, but it is of interest at this time in particular in discussing the relations which should prevail, and which have not prevailed in the past, between the consumer and the producer."

A FARMER'S EXPERIENCE.

Until this last two years I have always felt that, while tree plantations about the buildings were most highly desirable, they also had their drawbacks. While there is nothing that protects the farm home like a grove of trees and gives it a homelike appearance, the trees take a lot of moisture, and it is almost impossible to grow a garden close to trees or inside a small wind break. Further, in the spring after a heavy snowfall the trees hold the snow and frequently keep the ground near them wet very late in the spring. A row of trees along the road sometimes makes the road impassible for weeks.

Last spring, however, and again this spring, I have come to put a higher value on the trees on my farm. I have a wind break running south from the road for about 20 rods. It was planted ten years ago and is 14 to 20 feet high. A field just east of this wind break was summer-fallowed and seeded to wheat in 1918. It ran south the full half mile and was 60 rods wide. Over half this field at the south end was completely drifted out. Where the shelter-belt protected the field from the west and northwest winds I never had a better crop and it checked the force of the wind right across the 60 acre field.

This year I noted the same effect on a neighbor's farm. On my own farm the field was spring plowed and none of it drifted badly. I have come to the conclusion that the policy of planting a system of wind-breaks is the only permanent measure of controlling soil-drifting. In planting I would suggest that they be planted in rows half a mile apart, running north and south. Nearly all the high winds that do the damage are almost directly due west winds.

I realize that such a plan must be started on a small scale, but it would soon grow to be the greatest tree plantation ever undertaken.

Sask. G. H. SCOTT.

A Canadian Flag Staff's Strange Journey

For more than fifty years, that is to say, from 1861 to 1913, the flag staff of Douglas fir standing on a mound in the Berberis Dell, constituted a conspicuous landmark in the Royal Gardens, Kew. It was a present to Kew from Mr. Edward Stamp. The original staff was 159 feet high, and calculated to be about two hundred and fifty years old. It was repaired and rehoisted in 1896, but in 1913, when it was being varnished, it was found to be affected with dry rot, and consequently it had to be taken down and, as further repair was out of the question, there came an end to the finest flag staff of its kind in Europe.

The Search in B.C.

The provision of a new staff created a great deal of interest, not only at Kew, but throughout this country and in British Coumbia, whence the original flag staff came. An interesting account of the history of the new flag staff, finally erected on October 18, 1919, is given in the Kew Bulletin. From this we gather that the Provincial Government of British Columbia offered to present a new spar of Douglas fir to the Royal Gardens, Kew, to replace the old one, and on February 25, 1914, this offer was accepted. As a result, the forests of British Coumbia were searched by skilled woodmen until a tree was found that fulfilled the exacting ideal of the searchers; yet it was not until eleven trees had been felled that the requirements were met. The tree selected was found some thirty miles north of the city of Vancouver. After it had been felled, its length was reduced to about 220 feet, but its height as it stood in the forest was probably between 280 and 300 feet. The tree was conveyed by rail and water to Vancouver, and there shaped to its present form by expert axemen. It is square at the base for 15 feet up, then octagonal up to 157 feet, thence to the summit (214 feet) it is round. Its diameter at various heights, is as follows: Base, 33 inches; 15 feet, 33 inches; 52 feet, 29⅜ inches; 89 feet, 25⅜ inches; 115 feet, 22½ inches; 190 feet, 19 inches; 214 feet, 12 inches (summit). The pith is not in the centre, but five and a half inches from one side at the butt end; from the pith to the other side of the margin there are 360 annual rings. The first 100 rings occupy 17¾ inches, the next 100 rings, 7 inches, and the third hundred are compressed into 3½ inches. The tree was 6 feet in diameter at the base when felled, and practically all the sap wood was taken off in shaping it. It is estimated to be about 400 years old, and the weight, roughly 18 tons, is about four times that of the old flag staff.

The Flag Pole's Travels.

The directors of the Shire Line of steamers undertook to convey the flag staff from Vancouver to the River Thames, and on December 29, 1915, the S.S. "Merionethshire" arrived safely at the London Docks and dropped the spar into the Thames. It was towed up the river to Kew, and finally conveyed through the gardens to the base of the flag staff mound, where it remained for a period of 2½ years, and was a source of pride to the many Canadians who saw it. It was hoped at one time that the Canadian Forestry Corps would undertake the task of erecting the staff, but they were unable to do so, although the concrete blocks forming the base were set in the mound under the direction of engineers of the Canadian Forestry Corps. Messrs. Coubro and Scrutton eventually raise dthe flag staff, under the direction of H.M. Office of Works, by means of a derrick 100 feet high. A square block of steel, 7 inches in diameter, is fitted into a groove at the base of the staff and thus supports it. The new flag staff, which towers far above the surrounding trees, is a magnificent exhibit for Kew, a testimony to the generosity and Imperial spirit of the

Premier and Government of British Columbia, and an example of the marvellous tree growths that make the forests of that fine province some of the richest on the face of the globe.

The Gardeners' Chronicle, Jan. 24th, 1920

Great Profits from Forests in the French Jura

By Theodore S. Woolsey, Jr. (Formerly Lt.-Col. U.S. Engineers)

Written for the Canadian Forestry Journal

71,000 Board Feet per Acre Produced Under Careful System of Forest Management

One of the questions asked by private forest owners and others interested in the yield of forests, is what will forests (naturally regenerated) return in lumber or money? The answers given to this question by normal yield tables, usually based on planted stands, are often so high that they cannot be applied to Canadian or American conditions without much guesswork and modification. Actual averages of compartments or whole forests are more reliable for purposes of judging what forestry can attain. Therefore the statistics* that follow, for fir-spruce forests in the Jura mountains of France, somewhat comparable to spruce-fir stands of northern New England or Southern Canada, are of particular interest and value. They show what forestry can attain (as a maximum) **under favorable conditions** on non-agricultural mountain land over whole compartments of 15 to 30 acres.

(a) Compartment 18, 5th working group, State Forest of La Joux (2nd Jura Plateau), 60% fir and 40% spruce, fully stocked thrifty stand, planted after a windfall in 1812; 100 years old in 1912.

Per Acre.

Diameter Breast High Inches	No. of Trees	Vol. Cubic Metres	Approximate Board Ft. and Cords
10	45.6	32.4	5,700 4.8
16	63.6	112.0	32,300 15.0
22	24.8	88.0	23,400 11.8
28	3.2	24.0	7,200 1.6
Totals	137.2	256.4	68,600 33.2

(b) Same forest and working group but compartment 19, and **from entirely natural** regeneration; 100 years old, but 90% fir and 10% spruce.

Per Acre.

Diameter Breast High Inches	No. of Trees	Vol. Cubic Metres	Approximate* Board Ft. and Cords
10	67.2	47.2	8,400 7.2
16	98.0	170.8	45,300 22.6
22	35.2	123.6	33,800 16.4
28	4.0	24.0	7,200 1.6
Totals	204.4	365.6	94,800 47.8

*These conversions (a, b, c, d) were made as follows: For 10 inch trees 4 cubic metres were counted to the 1,000 feet, after 30 per cent. subtracted for cordwood. In the other diameter classes 3 cubic inches were counted to the 1,000 feet after subtracting 20 per cent. for the cordwood in the 16 and 22 inch classes, and only 10 per cent. of the 28 inch class. Two cords were considered equal to 1,000 board feet.

Such yields seem incredibly high, and the larger number of trees and the higher yield on the area naturally regenerated is especially noteworthy. The fact remains that these yields

*Based on unpublished data supplied by Devarennes, Inspector, French Forest Service, in charge of Jura working plans in 1912. Canadian Forestry troops operated on an extensive scale in the Forest of La Joux.



Spruce, Hemlock and Cedar, Moresby Island, Queen Charlotte Islands.



Muskeg Type of Country, south of Masset Inlet, Graham Island, Queen Charlotte Islands.

were attained within 10%, allowing for a possible 10% error in estimate.

(c) Pure spruce 100 years old from natural regeneration on a compartment in the forest of Ouhans (first Jura Plateau), altitude 2,300 feet.

Per Acre.

Diameter Breast High Inches	No. of Trees	Vol. Cubic Metres	Approximate* Board Ft. and Cords	
10	97.2	60.8	10,600	9.2
16	84.8	151.2	39,600	21.6
22	13.2	54.4	14,500	7.2
Totals	195.2	266.4	64,700	38.0

(d) 90% fir, 10% spruce, 100 years old from natural regeneration on a compartment in the forest of St. Point (third Jura Plateau), altitude 3,280 feet.

Per Acre.

Diameter Breast High Inches	No. of Trees	Vol. Cubic Metres	Approximate Board Ft. and Cords	
10	76.8	44.8	7,800	6.8
16	64.0	119.2	31,800	15.8
22	13.6	57.6	15,400	7.6
Totals	154.4	221.6	55,000	30.2

These four compartments average almost 71,000 board ft. per acre and indicate what can be attained under proper forest management, in 100 years on a maximum with thrifty, vigorous stands of silver fir.

Editor's Note.—The average yield of natural balsam fir and spruce stands in Eastern Canada is from 5,000 to 10,000 board feet per acre.

An Article for All Planters and Shade Tree Owners

Relative Value of Shade Trees, with Special Reference to Rapidity of Growth

By F. E. Buck, Central Experimental Farm, Ottawa

The sole object in planting shade trees is not merely to obtain shade; indeed one main object is to complete the architecture of the street or house surroundings, as the case may be. Quick realization of the objects in planting a shade tree is of course desirable, but rapidity of growth is generally looked upon as an undesirable characteristic of a shade tree. The reason is obvious perhaps. Rapid growth is generally correlated to weakness of wood and tendencies to decay, and therefore a short-lived tree is the result. A tree is a living beautiful thing, and its values reside in its more permanent qualities of beauty of form, cleanliness, longevity, etc., rather than in the temporary quality of quick growth.

Nevertheless, with these reservations recorded, it may be said that there is an advantage in having shade, especially where combined with other good qualities, just as soon



In Cressman's Woods, of which Waterloo County, Ontario, is justly proud.



as possible, and it is the purpose of these notes to indicate which trees may be relied upon to give, as soon as possible, satisfactory results in regard to both shade and the other qualities which should be required in all shade trees, especially street trees.

Soil and Location.

This should be recorded, namely that soil and conditions under which the trees are planted have a great deal to do with the rate of growth. For example, if Sugar maples are planted in a soil of a heavy clay type the rate of growth will be about one-fifth of what it would be were the trees planted in a loamy soil. Trees which are planted in wind swept positions, or where the extreme heat of summer affects them considerably, will make much slower growth than when located under favorable conditions.

It should be stated also, that as a general rule there is very little difference in the comparative rate of growth of most of the best trees for shade purposes. Trees make the most rapid growth for a period of about twelve years after planting; they then settle down to an increase in height of about one foot per year, or slightly more in years which are favorable to growth.

1. Large Sized and Generally Rapid Growing Trees.

The trees in this group are suitable for planting in wide streets or for lawn and park planting, where there is an abundance of room.

American Elm (Ulmus americana)
Silver or White Maple (Acer saccharinum)
Cut-leaved Silver Maple (Acer saccharinum Wieri)
Basswood (Tilia americana)
White Ash (Fraxinus americana)
White Oak (Quercus alba).

The fastest growing trees in this group are the American Elm and the two Maples. The cut-leaved Silver Maple is a specially fine tree for lawn purposes; the first year after planting, until it has attained a height of seventy-five feet, it makes very rapid

growth. The same is true of the Elm, although the Elm is much more suitable for a street tree. As a lawn tree it is a great robber of soil food and moisture and in this way frequently injures adjoining vegetation.

Recorded Measurements of Tree Growth.

Average yearly growths of trees grown under lawn and avenue conditions, from records kept at the Experimental Farm:

American Elm	15	inches
Silver Maple	14	"
Cut-leaved Silver Maple	24	"
Basswood	12	"
White Oak	8	"
White Ash		

2. Medium Sized Trees of Fairly Rapid Growth:

The trees in this group are suitable for streets of ordinary width, or for use in home grounds, parks, parkways, etc.

Sugar or Rock Maple (Acer saccharum)
Red Maple (Acer rubrum)
Norway Maple (Acer platanoides)
Red Oak (Quercus rubra)
White Birch (Betulus alba)
Horse Chestnut (Aesculus Hippocastamem)

The fastest growing trees in this group are the Birches and the Maples. The Sugar Maple is the best tree for general street planting in localities with a temperature similar to Montreal or Ottawa. The Red Oak is the fastest growing of the oaks and is a very fine street tree. It is greatly prized in some American cities. At Ottawa its rate of growth under favorable conditions is on a par with that of the Norway Maple and some specimens of the Sugar Maple.

Average Yearly Growths, Over a Definite Period, of Trees Grown under Lawn and Avenue Conditions.

Sugar Maple	6	inches
Red Maple	about 6	"
Norway Maple	10	"
Red Oak	14	"
White Birch	8	"

In the record above the small amount of growth made by the Sugar and Red Maples has an explanation. Under other conditions these trees would have shown double this growth.

(To be continued.)



Consequences of a forest fire in Central Quebec.
Photograph taken by Henry Sorgins immediately after the fire was extinguished.

Controlling Torrents in France

By H. R. MacMillan,

When the French Programme is Completed, Total Cost Will Not Exceed One Year's Damage

(Republished from an earlier Forestry Journal by request.)

The damage due to floods and torrents from denuded water-sheds is probably the least serious of the effects of forest destruction in Canada. Nevertheless very large sums are being expended annually by railways in protecting road bed and bridges and by municipal, provincial and Dominion authorities in protecting roads and public works against damage by torrents. The total amount so expended in Canada each year, while unknown, must be very great indeed. Canadians may therefore be assumed to be interested in the manner in which the control of torrents has been accomplished in France. It will be observed that whereas the expenditure in Canada is usually at the bottom of the stream in protective works, which will be a source of expense, the expenditure in France is chiefly at the seat of the difficulty, in reforesting the catchment area of the torrent, a work which will require outlay for a few years only, and which in some coses may actually become a source of revenue. Certainly the French system is more farsighted than the Canadian.

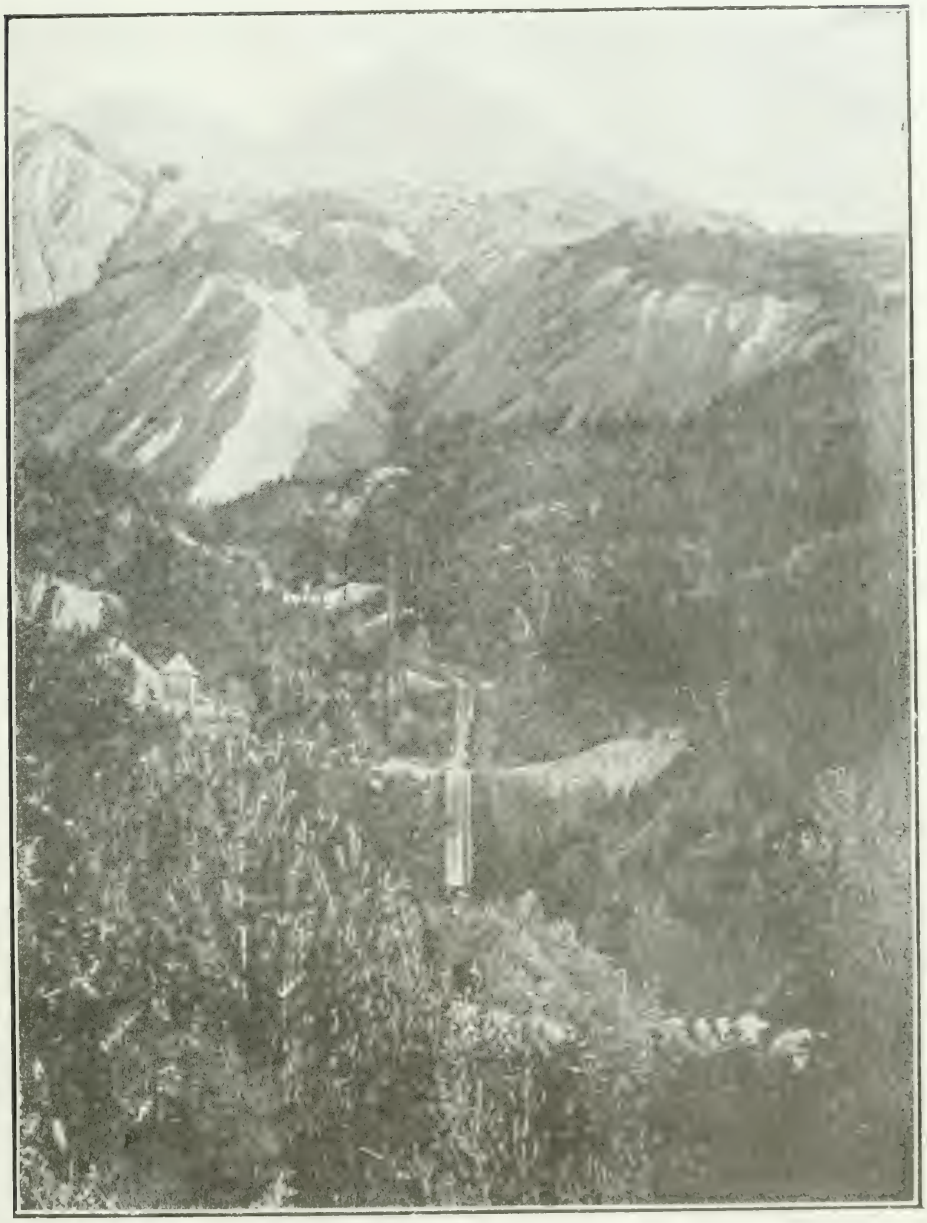
Since the sixteenth century the problem of control of torrents has been periodically before the French public. Investigation of torrential action in 1797 gave rise to local laws for flood control. Very little action was taken, however, and discussion proceeded spasmodically until the tremendous floods of 1856 in the valleys of the Seine, Rhine, Rhonde, Loire and Garonne, involved the whole of France in a loss reaching hundreds of lives and $40,000,000 in property. Always as elsewhere both with forest fires and floods, discussion of flood prevention in France had been most active after disasters which touched both the public imagination and the individual family or pocket. Sufficient had already been learned concerning the causes of the mountain floods, both from the investigations of engineers and the work already carried out by the Government to point out the proper method of regulating destructive torrents and, accordingly, in 1860 a law was passed providing for the reforestation of the catchment areas of destructive torrents, the work to be carried out by the Forest Department. The defects of this law were that the money provided was not sufficient for undertaking the work on the scale designed, the reforestation of the mountain catchment areas decreased the grazing areas, upon which depended the mountain population, and the right assumed by the state to expropriate communal lands for reforestation purposes upon terms which threw the expense of the work largely on the mountain communities. Protest, culminating in armed resistance, led to the amendment of the law, substituting sodding for reforestation in areas where grazing was of paramount importance Sodding did not prove a satisfactory means of stream control, and the other defects remained. Finally, in 1882, after 18 years of agitation, the work of torrent control was placed upon a new basis by the law at present in force

All Interests Considered.

The Forest Service still remains responsible for the work of stream control. Works are undertaken only where soil erosion has begun. The projects of the Forest Service are examined by a government commis-



These pictures graphically illustrate the success of torrent control in France. The first shows a torrent in the Lower Alps, the bed of which has been built up by barrages behind which sediment collects. This photograph was taken in 1887; note what has happened since, as shown on opposite page.



A picture of the same area twenty years after. The barrages by preventing the cutting down of the bed of the river have also prevented the erosion of the banks which are now covered with forest.

sion on which local interests are represented and the boundaries of the area within which remedial works were large, and the formation of revenue bearing forests was an integral part of the scheme. Now an effort is made to restrict to a minimum the area upon which works are conducted, and on this restricted area to undertake intensive work, not only plantations to fix the soil and check the run-off, but also engineering works to break the descent of the water and support the banks and beds of the torrent. Large areas of forest are being established in the lower Cevennes.

The works conducted by the State are carried on only on land belonging in fee simple to the State. Should there be within the area necessary for the control of a stream and owned by bodies and persons other than the State, one of two courses is adopted.

Taking Private Lands.

The State may buy or expropriate the necessary land. The right of expropriation is rarely exercised. The State acquires by friendly agreement the land on all streams where the public interest in the control of the stream is paramount.

The owner of the land, whether a private individual or a community, may retain the property upon condition that an agreement is made to conduct within a term of years fixed by the Forest Service under the supervision of the Forest Service the improvement works necessary. Communities usually avail themselves of this privilege, and in such cases both the State and the departments in which the community is situated make money grants equal together on the average of one-half or two-thirds of the cost of the work. The State also assists with advice, and in the case of reforestation with seed and plants.

The law also names certain mountain communities in which, because of their important effects on stream flow, pasture lands must be treated according to conservative regulations in order to prevent destruction of the sod cover by over-grazing. Any ordered management of mountain pastures has been strenuously opposed by the mountain population, even thought the object of all such regulation of use is the improvement of the pasture. Money grants have been made by the State, and assistance has been given freely in all cases where private individuals or communities have shown a disposition to protect mountain pastures. Nevertheless, the opposition still persists. A commission was appointed in 1910 to study better means of improving conditions and amendments to the law were under consideration at the outbreak of war.

Developing Specialists.

The French Forest Service in vigorously taking up the responsibility placed on it by the law of 1882 has led the world in works for torrent control. Foresters and engineers have co-operated in checking the destructive headlong plunge of waters from the Alps, Cevennes and Pyrenees. Half a century of experience, dating from the earlier laws, has led to the growth in the Forest Service of specialists in stream control, who have developed several well-defined methods of accomplishing their object.

The reforestation of the catchment areas of the torrential streams and their tributaries was in the early years, the only means adapted for the control of water-flow. Even now, although in certain conditions it has been found necessary to rely on engineering works reforestation remains the greatse weapon in the hands of the Forest Service. The catchment areas have been re-clothed extensively by planting and seeding, both with broad leaves and conifers. It has been found that, except in the few situations where conditions are very favorable for forest growth, planting is much more satisfactory and even more economical when results are considered. Nurseries have been started near all the large projects,

and coniferous species are used for an overwhelming proportion of the work, the most common of which are the pines, P. sylvestris, P. cembra, and P. uncinata. Other conifers planted extensively are larch (Larix europaea) in the Alps and Pyrenees, and fir (Abies pectinata) in the Cevennes and Pyrenees. Broad leaf trees, chiefly various species of alder and willow, are planted in the beds of streams and on steep banks where it is important that a soil cover be rapidly established. Beech (Fagus sylvatica), chestnut (castanea vulgaris are commony used in the Cevennes and in the Pyrenees.

At the beginning of 1909, 629,488 acres had been reforested at a cost for establishing the forest cover of $8,000,000 or $12.70 per acre. Of the total, 363,151 acres have been reforested by the State, 134,005 by the communes, and 132,332 by private owners. The State has given valuable assistance to both the communes and the private owners, having paid 55 per cent. of the cost of the work accomplished by the communes and 37 per cent. of the cost of the reforestation carried on by private owners. The departments have also made small money grants for reforestating in the mountains amounting to 23.5 per cent. in the case of work done by communes, and 5 per cent. in the case of plantation by private individuals. The total cost of the reforestation work to the State up to 1909 has been $5,568,683 on State projects; $812,807 subventions to communal projects; $348,744 subventions to private works; total, $6,730,234.

The remainder of the expense of establishing cover on the catchment areas of mountain torrents has been shared as follows: Private owners, $546,488; departments, $400,723; communes, $320,921.

Costs of Land Purchase.

The programme of work is by no means completed. The land already purchased by the State, 325,265 acres, represents only about 55 per cent. of the area for the acquisition of which plans have been completed. There still remain 266,047 acres, the purchase of which will be necessary. The average cost of the land purchased in France for stream control is $18.50 per acre. The expenditure in the purchase had reached in 1909, $6,022,644, and it was estimated that a further $3,500,000 would be required.

Over 92 per cent. of the land already purchased will be reforested. The remainder consists of rock outcrops and areas above timber line.

Reforestation alone is not always sufficient; where the catchment area of the stream is very small, where the immediate control of waterflow is an important consideration, where the slopes are very steep and the banks lack stability or where a very rapid fall of water must be broken, recourse must be had to the erection of barriers. The French Engineers in the Department of Waters and Forests are credited with leading the world in the construction of works for the artificial control of mountain streams. Over half a century of experience has developed several well-defined methods of correcting the flood tendencies of runaway streams.

The small tributaries, high in the mountains, which are dry during a portion of the year, but down which in the season of melting snow or rain the water sluices without obstruction, are first attacked. The most common method here is to cover the bed with a woven network of branches, held down by stakes or by poles crisscrossing the bed and driven into the banks. The bed of brush catches material brought down by the water, prevents the carriage of gravel and rock to the stream below, and prevents erosion.

Bracing Up a Stream Bed.

At other times when branches are not available barriers of faggots, sods and stone are constructed at frequent intervals across the bed of the stream, the purpose of which is to hold up the water, catch sediment and prevent the cutting of the stream bed or

banks. The barriers are rendered permanent by planting with shrubs or with cuttings of such species as willow and alder, which strengthen the banks, protect the bed of the stream, and form a living network of branches and roots to hold back flood waters and their burden of earth and rock.

Those portions of streams in which a large volume of water is flowing, where the bed and banks are rapidly cutting, and where torrential characteristics have already developed, require more serious treatment. In such cases masonry walls are built with the object of impounding the products of erosion, checking the headlong flow of water, preventing the cutting down of the bed of the stream, supporting unstable banks. The bed, banks and flow of the stream are carefully studied before work is begun, and walls and barrages, as they are called, are designed to meet the requirements of each particular case, both so that the masonry itself may meet the stresses to which it will be subject, and further that the detritus accumulated by the masonry will prove an indirect support to shifting banks and a valuable means of decreasing the grade and checking the speed of the stream. According to the gravity of conditions the barrages vary from simple dry stone sills set across the bed of the stream a few feet apart, to mortar-set stone walls three feet or more thick, fifteen feet high, crossing the stream from bank to bank, set so close together that the top of one wall is level with the base of the next barrage above it.

Sometimes it has proven easier to pave stream bottoms, canalize the waterflow, or create new stream beds than to correct the torrent by barrages; where necessary this is done. Occasionally also the constant sliding in of stream banks crushes the strongest barrages. Draining is then resorted to on a large scale in order that the banks may be fixed.

Preventing Snowslides.

The prevention of avalanches and snowslides is also undertaken. Snowslides usually follow definite courses. Stone walls five to six feet high, two and a half feet thick, are built across the upper courses of dangerous snowslides beginning at the point where the avalanche usually takes its start and continuing down the slope in ranks to the point below which snowslides are unlikely to start. When stone walls are impracticable, the desired results are secured by low banks of loose rock or earth disposed in the same manner. When conditions permit of it, plantations of trees or shrubs are made under shelter of the walls or banks.

There have been very few torrents upon which work has been done by the French National Government upon which some or all of the above corrective works constructed up to 1909 exceeded the cost of reforestation on the same streams, being over $6,560,000, including maintenance to the same date. The question of maintenance is a serious one. All the works require constant upkeep, and some have had to be rebuilt several times.

The opposition of the mountain population has been overcome in various ways, by employing them on the works, by money grants for pasture improvement, and by subvention to creameries and co-operative dairy associations. The total amount of such expenditure is about $35,000 chargeable to the fund for the correction of torrents.

The work which the French have undertaken, re-clothing the drainage basins and remodelling the beds of thousands of mountain streams, should, when finished, rank with the great constructive public works of the world. The task is now half completed. The cost up to 1909 was $20,650,000. The estimated cost for the remainder of the work in sight was then $12,000,000, exclusive of upkeep and exclusive of the expenditure necessary by departments, com-

munes, and private individuals. Such works, however, should not be measured by cost, but by results. The obliteration of the torrents of France, impossible as it may have appeared in the beginning, will be practically accomplished with the completion of the programme now adopted. Torrential floods, which in one year wrought destruction equal to the total cost of stream improvement, will be no longer possible, and neither the vineyards and farms of the lower valleys, nor that important mountaineering element of the population which clings to upland slopes and valleys will hereafter be in danger by flood or snowslide. The price of one year's flood carefully expended will permanently add millions of acres to the productive area of France.

Stopping Prairie Gales by Tree Planting

"It is forty miles to water,
It's just as far to wood;
I'm leaving the short grass country,
And I'm leaving it for good."

How many of the drought-stricken settlers of the arid plains of Southern Alberta and South-western Saskatchewan will carry out the purpose expressed in the verse above? For three years they have seen their crops blasted by hot winds. Their resources have steadily diminished and many of them last season have been forced to sacrifice their cattle. Their misfortune is largely due to hot winds. Stop the wind and you lessen the effects of drought.

Further east in the more humid country, thousands of acres of grain during the past three seasons have been lost through soil-drifting caused by winds.

The injury done by soil-drifting is not confined to the immediate loss of the crop. One storm will remove more fertility from the soil than five successive grain crops. The time has come when in all seriousness we should consider these problems, not as local, but as national. Every acre of crop lost increases the cost of living, and decreases the ability of Canada to carry her heavy financial load.

The most effective plan to check the force of the winds is a tree-planting scheme embracing the whole of the southern prairies. It is not the plan of one man; it is the plan of many; it was recommended by far seeing men before prairies were settled. It has been discussed in all its bearings for forty years. Briefly the plan is this: Plant shelter-belts around the farms and woodlots around the farm buildings.

In a certain district in Southern Manitoba is a farm largely protected by poplar bluffs. Across the road is a farm with a similar soil but without this protection. In 1919 this district suffered from hot winds. On the bluffy farm the wheat in summer-fallow yielded 20 bushels per acre; the summer-fallow on the unprotected farm yielded 15 bushels per acre, a difference of ten dollars per acre. It is a conservative estimate that hot winds and drought together with soil-drifting caused a loss of one hundred million dollars to Western Canada in 1919. Is not the matter then of national importance?

Why Soil Drifts.

The one great cause of soil-drifting is the depletion of humus by continued cropping and pulverization of the soil in continued summer-fallowing. Putting fibre back in the soil by leaving the land in grass for a number of years will check the evil to a limited extent. This method has its limitations, however, for there is a lamentable lack of cultivated grasses

which will give a satisfactory yield of hay or pasture in a dry season in the dry belt. Annual sown crops under such conditions will give a more satisfactory yield. The dry belt was a "short grass country" before it was put unde cultivation, and the grass has yet to be found that will turn a dry region into a "long grass country."

There is the difficulty of securing a catch of grass seed under arid conditions and on drifting soils. Land must be summer-tilled every second, or third year to store up moisture to produce a crop, either by summer-fallow or inter-tilled crops. Summer-fallow causes soil-drifting, but is necessary to crop production. In an old settled country, tenant farmers cannot adopt a rotation which includes grasses. They work on the short term lease system, and a grass rotation would be unprofitable to them.

Again grass means stock, stock means that good buildings are necessary. At present the high cost of building material and of labor makes grain farming more profitable than stock farming. In other districts the lack of water makes grain growing the only kind of farming which can be carried on.

Methods to prevent and control soil-drifting must be carried out by all in the district affected, or they will fail. It has been found that if a shelter-belt is twenty feet in height it will protect the field for one thousand feet from wind. Under average conditions a shelter-belt will reach that height in six or seven years after planting.

It is suggested that the scheme be experimented with first in a given area, and if found practical, carried out by co-operation between federal, provincial and municipal authorities. It could be financed by bond issues paid off by taxation of the lands benefited. Adoption of th escheme should be optional with rural municipalities by popular vote. Central nurseries would be established in each given area to grow the necessary trees.

There is one objection to the adoption of this scheme, and that is that the winter roads would be made impassable by snow drifts from the shelter-belts. This is not as serious as it seems, for in a district where shelter-belts were universal, snow-drifting would be greatly lessened. Winter roads are not impassable in bluffy districts throughout the West. The winter roads could be made across the farms, or the shelter-belts could be planted every alternate mile. The east-and-west roads in most of Saskatchewan are two miles apart. Could not the winter roads be the same?

Fence Posts and Fuel.

There are other benefits from such a scheme besides checking hot winds and preventing soil-drifting. Tumbling weeds, particularly Russian thistle, would be checked. Within ten years fence-posts and summer fuel could be cut from these plantations. This alone would far more than pay the costs of the scheme. We fondly imagine our timber resources are inexhaustible; they are not, and if the present rate of destruction by forest fire and settlement of the wooded country continues, within ten years fencing material and cordwood will reach prohibitive prices.

Summer and winter shelter for stock would be provided. There would be a great increase in the bird population and a corresponding decrease in the insect population.

Late spring and early fall frosts would be lessened. Practical horticulture could be carried on everywhere.

By J. H., in *Montreal Weekly Star.*



Douglas Fir, Red Cedar and White Pine, Columbia Valley, B.C.



Red Cedar in Columbia Valley, Interior Wet Belt of British Columbia

The Forestry Problem in Ontario

By E. J. Zavitz, Provincial Forester

How the Province Can Take Highest Profits from 50 Million Acres of Forest Lands

A small beginning has been made in tree planting, but the great province of Ontario has scarcely awakened to the real needs of a progressive forest policy. Ontario is still in the primitive stages of exploitation, and is only beginning to feel the pinch of high wood prices and lack of supply. We have not yet begun to consider our forests as producing continuous wood crops.

I present this problem to you because it is your problem. You are joint owners in at least fifty million acres of forest lands which can never come under the plow and can only be kept productive by the growing of forest crops.

The Laurentian plateau, extending from the Ottawa river to the Manitoba boundary, comprises a potential forest area of fifty million acres, an area larger that that of England and Wales. This vast region of Archean rock formation has here and there pockets of soil which may be suited for agriculture, but in the aggregate this area must be managed for forest crops if it is to remain permanently productive.

As joint owners in this property you are interested in seeing it managed so that it will yield a perpetual revenue to protect you from the burdens of direct taxation. At present our gross revenue is about one and a half million dollars from this property. I need only point to the forest revenues of some other countries to indicate the possibilities of future revenues to be expected from our permanent forest regions. Previous to the war France had 2,700,000 acres of state forests producing an annual net revenue of about four and a half million dollars, or about $1.75 per acre. Saxony, with 430,000 acres of state forests, realized an annual net revenue of $5.30 per acre. Throughout western Europe this story can be repeated of state and municipal forests producing splendid returns.

Examp'e in France.

Many of our experienced lumbermen serving in France were amazed at the wonderful condition and productiveness of the French forests. That the timber from the forests of France helped save the situation in the late struggle is now a record of history.

Do you know the story of these French forests or that of the forests of a large part of central and western Europe? At the end of the 18th century conditions were similar to those to be found in many parts of Ontario today. Great regions of sand wastes —overcut and burned forest areas — this was the story in Central Europe at the time of the French Revolution. You have heard of the reclamation of the sand wastes in France. One area of two million acres known as the Landes, has been reforested during the last century, and is today covered with a forest valued at one hundred million dollars. Not only have they been reforesting waste areas, but the mutilated forests of western Europe during the past century have been brought up to a high state of productiveness.

At present we have great sand areas in Ontario denuded of forest growth and lying waste. In the non-agricultural regions of the Laurentian plateau we are still cutting and burning with little thought of the future. In many parts of this region where definite investigations have been made we find that unregulated cutting and burning have left a state of affairs which will cost a large amount of time and money to restore even to

normal forest conditions. Many of you are familiar with these waste areas, with their misdirected efforts at agricultural settlement. While a large portion of our permanent forest region is yet in undisturbed, virgin condition, should we not begin to think of managing this property with some thought for the future?

While you have a personal interest as citizens in the administration of the vast forest areas of the north, I will now refer more particularly to the forestry problems of older Ontario.

Township Conditions.

Southern Ontario has some three million acres of private woodlands and over three million acres of waste areas which can only be made productive by reforestation. This older portion of the province has about nine per cent. of indifferent woodland with many townships having less than five per cent. of woodand. While ony of relative importance it should be pointed out that none of the important countries of Europe are so low in percentage of woodands. Italy has fifteen per cent., France had about eighteen per cent., and western Europe may be said to have from fifteen to twenty per cent. of forest area. So far as the chief forest products such as building materials, railway ties and pulpwood supplies are concerned, southern Ontario is absolutely dependent upon outside sources. The wood working industries of Southern Ontario are largely dependent upon supplies of the more valuable hardwoods from United States. We are fortunate in still having suppies of soft woods in Northern Ontario. These supplies are becoming increasingly inaccessible and costly, so that it is a common sight to see southern pine and British Columbia lumber successfully competing with our native pine for building purposes and construction. We are informed by the Forest Service of the United States that the virgin supply of southern pine can only last about fifteen years, and it is certain that the United States will soon cease to export valuable hardwood in any quantity.

Must Look to Future.

The wood working industries of Ontario use approximately twenty million dollars' worth of raw materials. It is urgent that we make sure of the future supply of wood for these industries.

The census of 1911 gives the value of firewood and fence posts used in Ontario at $5,700,000. A large proportion of this material comes from the three million acres of private owned woodlands in older Ontario. While many of you are fortunate in being able to secure anthracite coal, yet a large portion of our rural population depend almost entirely on wood as fuel. The frequent repetition of coal shortages should make us seriously consider the necessity of developing a policy of producing wood crops upon every foot of non-agricultural soil in this older part of the province.

What then is the forestry problem for Southern Ontario? Protection and improvement of the remaining woodlands; the replanting of waste areas held by private interests and the reforestation of the larger areas of pubic ands existing in older Ontario.

The improvement of forest conditions on lands held by private owners is a most difficult problem. Private forestry on small holdings has proven unsatisfactory even in the older countries of Europe, because of the long time element in producing a crop. Artificial stimulus by remitting taxes has been tried in many countries, and has failed. We have an Ontario statute giving municipalities power to remit taxes on woodlands, but no evident result has been accomplished.

In democratic countries mandatory measures must fail. The most we can hope to do with private woodland owners is to educate by bulletins or other propaganda and to supply state aid in securing forest planting material at a low cost.

Demonstrations Needed.

The most important measure towards solving the problem is by establishing demonstration forests on the larger waste areas of the older parts of the province. The successful planting and developing of forests upon these areas will have a very great influence and educational effect upon the private woodland owners of any given region. This policy was entered upon by the government when a demonstration forest station was started in Norfolk county. This station consists of 1,800 acres of non-agricultural land, and should eventually comprise about 2,500 to 3,000 acres. At this station is established a forest nursery for producing planting material and forest plantations of various kinds are being developed. The results of this work are very encouraging and wornout sand lands planted in 1909, are today covered with young forests of pine, averaging 15 to 20 feet in height. Private owners of similar soils in this region are being influenced by this example so that we have in this district some very fine private plantations. During the past 15 years we have been supplying free planting material to prospective planters and we have throughout the province a large number of demonstration plantations.

The war interfered seriously with this work and our chief difficulty at present is to secure nursery stock to fill the demands. You will realize that it takes two to three years to produce nursery material suitable for shipping and planting.

Our work up to the present has been on such a small scale that it has not seriously influenced the problem. It must not be overlooked however, that it has pointed out the way. We should extend this work by the creation of similar stations to that in Norfolk, and undertake the problem of reforesting in older Ontario on a much larger scale, if we are to secure any real benefits from such a policy.

CUTTING METHODS.

Ferd. van Bruyssel, before the Engineering Institute, Montreal.

"Personally, I favor wherever practicable, the plan of clear cutting within narrow strips. To illustrate this, let us suppose a limit extends five miles in depth from what is known as a "tote" road, marginal to a stream, this road being staked at distances of 250 feet. Imagine parallel lines originating at each stake and prolonged perpendicularly to the river and road over the whole depth of the limit; then number the strips in regular sequence from right to left. First raze the strips of even number, which thereafter will be seeded from the standing timber on the adjoining odd numbered strips. When the seedlings on the even numbers have grown enough to bear cones, then raze the odd numbers, which in their turn will be seeded by the young trees on the even numbers. By the time the seedlings on the odd numbers have themselves become cone bearing, a second crop will have matured sufficiently on the even numbers. Also this second crop will be far more productive than that obtained from the primeval forest."

"The Forestry Association is doing a splendid work along many lines, and is worthy of the greatest possible support from Dominion, Provincial and private agencies. It has become a very definite force in the direction of getting things done along the lines of forestry and fire protection. Its usefulness would be greatly increased by the establishment of a branch office in the West, possibly at Vancouver, and it is to be hoped that the necessary financial support may be made available to this end."

From Report of the Commission of Conservation's "Committee on Forests."

Should the Planting of Shade Trees be left to the Individual, or Controlled by the City?

By F. E. Buck

Assistant to Dominion Horticulturist.

Citizens of all classes are generally agreed that the trees are one of the biggest assets of a city. When any city can be described as a city of beautiful trees, it at once suggests that such a city is noted for its beautiful streets and homes. Cities of such a type attract population on account of the pleasing character of the residential sections. A problem which has presented itself for solution during the past few years is: Whether the planting and care of trees in cities should be undertaken by the city or left to the individual householder or landlord? Where this work has been left to the individual householder, the results have been in most cases unsatisfactory. Individual work in such matters fails to produce the best results for certain reasons which are obvious. For instance, certain persons will plant different varieties of trees on adjacent properties, others will not plant at all, while in some cases the trees will be planted at irregular distances between each other, and also from the sidewalk. The effect of such an irregularly-planted street, when compared with one properly planted, is strikingly different.

Control by the City.

The great advantage of investing one of the city departments with authority to deal with tree planting and control is that the mistakes resulting from individual planting are eliminated. Such points as, the choice of a proper variety, the use of one variety only to a street to obtain harmony and beauty, and the proper attention to heading and pruning, are difficult points for individuals to carry out harmoniously, but in the case of some central authority, such points are carried out as the first essential of a system.

In many large cities like Paris, New York, Chicago and others, this work of tree planting and care is carried out by a Shade Tree or Parks Commission. Many other cities of smaller size have also, during the past few years, put such work under the control of a special authority. In many cases this authority consists of an official, variously known as City Forester, Tree Warden, Street Commissioner, etc. In some cases the work has been added to the City Engineer's Department.

PERMANENT COAST FORESTS.

(Pacific Coast Lumberman)

As to the present situation at the Pacific Coast, opinions differ greatly. Men like H. R. McMillan, ex-chief forester, and Roland Craig, of the Commission of Conservation, Ottawa, claim that the growth of new timber is five times the annual cut, and that therefore all that is necessary is ample fire protection to guard securely this satisfactory state of affairs. On the other hand, practical lumbermen who have travelled extensively over the province during many years, hold quite the contrary view. They say, most emphatically, that right now the growth is not sufficient to off-set the steady loss from logging operations, fire, wind, insects and fungi.

This difference of opinion should be settled with some definiteness and without delay. The situation is serious and of immediate concern, in view of the fact that from now on hundreds of loggers and millmen from other regions will be moving to our province and to the states to the south of us, in search of timber. If our forests are being depleted now, what will the situation be shortly?



Natural Reproduction of Douglas Fir after logging and slash burning. The new forest is 20 years old. Near Grief Point, Malaspina Strait, B.C.



A new Douglas Fir forest re-establishing itself on Powell Lake, B.C. It is 20 years old.

Wind and Fire Damage to Forests

By Frank J. D. Barnjum, Annapolis Royal, N.S.

Is There Any Net Increment in the Nation's Stand of Timber? Enormous Loss by "Blowdown"

In considering the question of growth in our natural, or, rather, unnatural forests, as they exist on this continent today, we have to figure not on some individual stand or township, but on a state or the country as a whole, and in cycles of 100 years, as the average spruce tree as harvested will run but little short of the century mark. I am perfectly willing to acknowledge that there is a growth to every living tree that has not passed maturity, has not blown down, or has not been killed by fire or some species of the hundred and one different bugs. I also admit that there is a combined net growth in some sections of a township and, in rare instances, in possibly a whole township. But to offset this growth, as there must be a debit as well as a credit side, we must charge off the wastage.

We will take the State of Maine for one example, as it is the most important wood-producing section in the eastern United States. Now ,if you will refer to the cruiser's map of almost any township, you will find a dotted path, in many instances running clear across the township of varying widths up to a mile or more, marked with the significant and familiar words "Blow-down" or "Wind-fall," which means that the timber in that designated section has been destroyed by wind.

The next most familiar word is "Burn," and quite often there may be two or three or more sections of a township that have been burned, running in size all the way from 50 acres up to 4,000 or 5,000, and in some cases, half or three-quarters of the township, to even, in the case of the Miramichi fire which swept across Maine, a burned area of more than three million acres. I can think of at least one fire in Maine, which occurred about 1903, which burned 100,000 acres, while another fire, in 1909, in the same State, burned over 45,000 acres, and these are merely two examples.

In addition to the large, well-defined areas of fire and wind destruction, there is a continual dropping by wind of a tree here and a tree there. This is going on all the time, and when you realize that it is only necessary to lose one tree per acre per year, varying in size from 5 inches to 12 inches in diameter, according to location and consequent rate of growth, to wipe out the entire growth by this one source of loss alone, and then when you add to this the heavy losses from the large wind-falls, fire and bugs, you do not have to stretch the imagination very much to realize that not only is your growth increment wiped out, but also quite a little of your principal as well. For this reason, the thought uppermost in my mind is to try to arrive at a figure that will approximate what this net loss really is.

In British Columbia 665,000,000,000 feet of timber have been burned, and this amount very nearly equals the total stand of saw timber remaining in Canada today.

In Maine, in the gale of 1883, a billion feet of soft wood were blown down, in addition to a very large amount of hard wood, in the two counties of Oxford and Franklin alone ,and the loss in the whole State was incalculable. I know of one township, which I afterwards bought, where one-third of the entire stand of timber was destroyed in this same gale.

I have in mind a windfall in Wisconsin, between Prentice Junction and Ladysmith, that covers a strip five miles wide and 50 miles long, where the timber was laid as flat as if tra-

versed by a steam-roller. All of this timber ,the result of more than 200 years' accretion, was destroyed in an hour. I cannot help thinking of an experience of my own in my earlier days, in this connection. I had been planting 10,000 trees per year for two or three years, when a fire came in on an adjoining lot and burned up more trees in two hours than I had planted in the three years, which discouraged any more planting by me at that time.

But the final and most convincing figures of all are contained in the valuable report by the committee of the Society of American Foresters, which was recently published, which says:

"That of all the total forest area in the United States of 500,000,000 acres:

"One hundred million acres and more are so devastated as to be almost wholy non-productive:

"Over 210,000,000 acres have been cut over and more or less damaged by fire, but are producing new timber, usually in small amounts;

"One hundred and fifty million acres are in standing timber where growth merely balances decay, with no net increase in wood production from year to year. On a large part of this area the virgin timber is of poor quality and very inaccessible."

Half Timber Lost by Fire.

In Canada, the Canadian Forestry Association states, one-half of the forested area has been burned over within the past 100 years. That this enormous wastage by fire is still with us is in evidence by the loss of 1,000,000,000 feet of timber in Montana and the 540,000 acres destroyed in Alberta, which are only two of the larger burns of last summer. The bugs are also still with us; and the wind, as one of my own countrymen says, "She blow all de time."

Now, with all this wastage above enumerated, it does not take a forester or a woodsman, but any man of ordinary intelligence to figure out that there is not only no annual growth to be counted on in the country or a state as a whole, but that there must be quite a net annual loss in addition. We have been simply fooling ourselves with regard to this question of annual accretion. I was myself a victim to this delusion up to three years ago, when I found a very large area which we had made preparations to log had all been logged for us by the wind over night. This so impressed me that I began figuring up this forest wastage, and the deeper I go into it the bigger it grows.

The vast amount of money that has been made and will be made in timberlands is not because of the growth of timber, but because of the great enhancement in values consequent upon the rapidly diminishing supplies.

Now, when you come to the destruction caused by the axe ,and take figures compiled from the United States forest service statistics, which amount to 244,000,000 cords of wood of all kinds, including fuel wood, harvested in the United States per annum, if this were piled in a solid pile four feet high and four feet wide it would reach a distance of 369,000 miles, or 123 times across this continent ,or more than 15 times around the globe.

In considering these appalling figures it would seem to me that it is now time to cease imitating the ostrich, and to begin to look this question of a rapidly vanishing timber supply on both sides of the line squarely in the face, and see where we are heading before it is too late; for a treeless continent is unthinkable.

Please send in your membership fee promptly.

The members are responding splendidly to our new plan of a Two-dollar Annual Fee, including subscription to the Forestry Journal.



How modern machinery in a Quebec factory fills maple syrup bottles and cans.



A Quebec Fire Fighting Crew.
Complete equipment is kept at selected places for use in extinguishing fires.

The Progress of Forestry in Canada*

Prepared by Clyde Leavitt
Chief Forester, Commission of Conservation

A Careful Review of Measures Adopted Throughout the Dominion for Perpetuating Forest Resourses

The year 1919 has been pre-eminently one of reconstruction. This is as true of forestry as of other lines of effort. During the war a very large percentage of the members of the forestry profession in Canada were engaged upon some phase of military service. With the return of most of these men to their previous occupation, forestry organizations throughout Canada have taken on a new lease of life and are showing greater activity along progressive lines than has ever before been the case.

There is also a keener realization than ever before of the prime importance which our forests play, not only in maintaining the industrial structure in Canada, but in the development of our foreign trade. The world-wide unsettling of the exchange situation has proved serious for Canada, as it has for other countries. Were it not for the large exports of forest products, particularly lumber, pulpwood, pulp and paper, the exchange situation, particularly with the United States, would be much more serious for Canada than is now the case.

Export of Forest Products.

The lumber industry is credited by the Bureau of Statistics with exports for the fiscal year ending March 31, 1919, to the value of $70,487,288, of which the greater portion went to the United States.

The growth of the pulp and paper industry in Canada has been nothing less than phenomenal, ranking, as it now does, third in the volume and value of its product exported abroad, and second in the amount of capital invested. Exports of pulpwood, pulp and paper are now at the rate of over $100,000,000 annually, of which about 80 per cent. goes to the United States. About 90 per cent. of the newsprint manufactured in Canada is exported. More than one-third of the newsprint used in the United States is of Canadian manufacture.

Obviously it is greatly to the advantage of Canada to manufacture at home as much of her raw forest materials as possible, instead of exporting them in an unmanufactured state. Home manufacture means the development of Canadian industries, the employment of Canadian labor, and vastly more money coming into the country than would be the case were our natural resources exported in a raw state. So far as the pulp and paper industry is concerned, it is the policy of the Dominion and provincial governments to require manufacture in Canada of all pulpwood cut from Crown lands. That this policy is greatly to the advantage of Canada requires no argument.

In view of the rapidly approaching exhaustion of the pulpwood forests of the north-eastern United States, the great pulpwood forests of eastern Canada assume an added value and increased economic importance. The necessity for so handling this great heritage that it may be permanently productive, instead of merely transitory, as in so much of the United States, can scarcely be over-emphasized.

While enormous damage has already been caused by fire and by unregulated methods of logging, so that great areas have been rendered barren wastes, it is still not too late to save the situation so far as the bulk of the territory is concerned. Indeed, much progress has already been made in this direction, though still only a beginning.

Saving the Young Growth.

Adequate protection from forest fires is the first great essential. Notwithstanding great progress already made, the experiences of the past year, with millions of dollars of damage done to the forests of Canada, prove conclusively that far from adequate attention is being paid this important matter. Over great areas, expenditures upon fire protection average less than one-half cent per acre per year. That this is not sufficient is proved not only by results, but by the testimony of men most experienced in this line of work. Our young forest growth is not now receiving the protection which its potential importance justifies.

In addition to the appropriation of adequate funds, it is of the most vital importance that a thoroughly efficient personnel be developed. To this end it is essential that adequate salaries be paid, that so far as possible the year-long basis of employment be adopted through the combination of various lines of forest work in a single organization, that every vestige of political patronage be eliminated in the selection of the personnel, that a really

*Constituting the report of the Committee on Forests, Commission of Conservation annual meeting, 1920.

efficient business administration be made effective, and that there be much greater development of permanent improvements such as roads, trails, lookout stations and the use of mechanical equipment in transportation and fire fighting. Only in this way may the several forest organizations be brought to the required degree of efficiency. The partial progress already made in these directions goes only to prove the truth of this statement.

The elimination of unnecessary waste of merchantable material in logging operations would go far toward lengthening out the period of years during which our virgin forests will supply the demand, and thus allow more time for the growth to merchantable size of the large areas of natural reproduction. That there has been serious loss on this account in years past is well established.

Using Hardwoods and Balsam Fir.

In the mixed hardwood-softwood forests of eastern Canada, not accessible to rail transportation, it is of the greatest importance that some method be developed by which the hardwoods, particularly yellow birch and paper birch, may be transported and utilized. The problem of transportation has not yet been satisfactorily solved. So far as utilization is concerned, indications are that a material percentage of birch groundwood can be used in mixture with spruce and balsam groundwood in the manufacture of newsprint. It is to be hoped that the pulp and paper companies may be able to find some satisfactory way to utilize the great amount of birch which is so greatly retarding the growth of the spruce and balsam reproduction on cut-over lands. There are, of course, other possibilities of utilization, to which every possible attention should be given.

There is a considerable prejudice against the use of balsam in the manufacture of newsprint, caused largely by insufficient knowledge of the species. Some companies claim that balsam cannot be driven for any great distance because of the loss from sinking when the logs are in the water for any length of time, while other companies are actually driving balsam for quite a considerable distance. One company, at least, has been allowing only ten per cent. balsam in its annual cut of logs, regardless of the fact that the species forms upwards of fifty per cent. of its total stand. The greatest trouble in the use of balsam seems to be the presence of pitch pockets caused by the efforts of the tree to heal wounds while growing. When the wood is reduced to pulp the pitch gets into the pulp and may cause trouble on the screens and paper machine. In spite of this, however, balsam **can** be used, as demonstrated by many companies, some of whom are using it indiscriminately in mixture with spruce, with quite satisfactory results. With the available supply of spruce decreasing so rapidly as to cause more or less alarm, and with balsam forming such a large percentage of the forests of Eastern Canada, particularly so in the young growth, the various governments and companies should and must see to it that this species is fully utilized if Canada is to maintain its position as one of the leading pulp producing countries of the world.

All these things are, however, not forestry, but are essential preliminaries to the practice of forestry The forest can be reproduced naturally by intelligent regulation of the methods of cutting as well as by planting. For the great bulk of our forest area, natural regeneration must be our primary dependence for very many years to come. We are as yet only upon the threshold of developments along the line of scientific forestry practice as an integral part of regular woods operations. It is, however, a most encouraging sign that so much attention is being given the problem of how we may reproduce our forests by wise use.

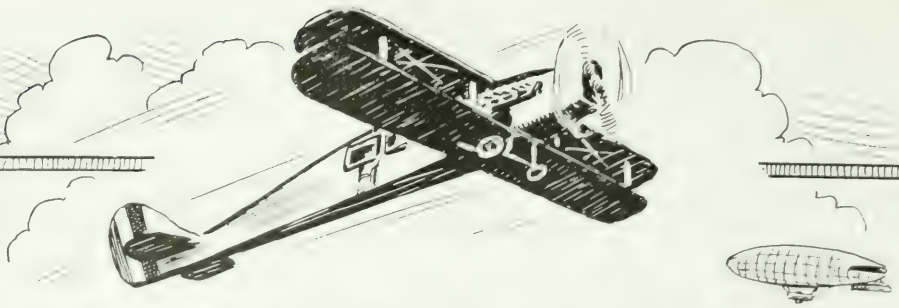
NEW BRUNSWICK.

The reorganization of the provincial Forest Service has proved a splendid success, with results alike favorable to the interests of the province as a whole and to the permanent welfare of the wood-using industries The judgment of the provincial government has been completely vindicated in utilizing fully the technically trained staff of the Forest Service in the administration of Crown timber lands, thus following the example previously set by the provinces of Quebec and British Columbia and by the Dominion Government so far as the unlicensed portions of the Dominion forest reserves are concerned.

Efficiency and economy have at the same time been furthered by making the one organization responsible for the various lines of forest work, including fire protection, enforcement of cutting regulations, timber scaling, and enforcement of the fish and game laws. This combination has rendered possible the development of a year-long staff of experienced men, with obvious advantage to the province, as contrasted with the former conditions of seasonal employment.

The Forestry Advisory Board, consisting of three representatives of the Provincial Government and two representatives of the timber owners, has functioned splendidly in directing the Forest Service, especially in eliminating the patronage evil in matters of personnel, thus furthering the employment and retention of the best men available.

The development of the Forest Service has been greatly facilitated by the return



WE ARE PREPARED TO UNDERTAKE AERIAL PATROLS AND SURVEYS AT RATES VERY MUCH LOWER THAN HITHERTO DEEMED POSSIBLE.

Our Aerial Photo Topography work determines elevations and contours accurately. Our photographs determine different varieties and numbers of trees.

Our experience is unequalled. The Air Express Services of the Aircraft Transport & Travel Company between London, Paris and Italy, and between London and Holland have operated with greater punctuality than the trains connecting with the Channel steamers. Our allied enterprises cover the world. We are the only firm in existence that has successfully carried out commercial air services and aerial surveys.

Our association with

THE GREATEST AIRCRAFT ENTERPRISE IN THE WORLD

and the superiority of our technical equipment and staff GUARANTEES SUCCESS.

Address all communications to the Canadian Office.

AIRCRAFT TRANSPORT AND TRAVEL, Limited

LONDON OFFICE: 25 & 27 Old Queen St., London, S.W. 1, England.

MONTREAL OFFICE: 301 Montreal Trust Building, Montreal, Canada.

from overseas service of many men experienced in the various lines of work with which the Forest Service is charged.

Particular attention has been paid to the revision and enforcement of regulations calculated to minimize unnecessary waste of merchantable material in logging operations. That such waste has in the past resulted in a drain upon the forest resources of the province as serious as it is unnecessary, is fully recognized.

Revenues Reach High Level.

The forest revenues have more than doubled during the past year, it being estimated that they will return a total of around $1,500,000 to the provincial treasury. This is approximately three times the amount of the forest revenue for 1917, and closely approximates the forest revenue of Quebec. It falls only a few hundred dollars short of the forest revenue of Ontario. This is on a cut of some 343 million feet of logs, ties, poles and pulpwood, supplemented by some minor sources of revenue.

In fire protection, the work of the regular staff has been supplemented in a very valuable way by making 60 of the woods superintendents of the licensees, co-operative fire wardens, with full authority to call out men to fight fires. To the same end, there are 154 voluntary fire wardens. The co-operation of 490 Road Commissioners was made available through the Minister of Public Works. Forest rangers and inspectors numbered 40, and temporary fire wardens 32, making a grand total of 776 men throughout the province directly interested, in an official way, in forest fire protection.

The Public Works Department has issued special instructions relative to the burning of slash along all new road construction, thus greatly reducing the fire hazard.

The permit system of regulating settlers' clearing fires continues to give admirable results. In New Brunswick, during 1919, 2,053 such permits were issued, of which in only five cases did the fires escape and require extra assistance to extinguish. On the other hand, of 36 settlers fires reported set without permit, 28 escaped and caused serious damage.

Considerable progress has been made in the construction of lookout towers, telephone lines, ranger cabins, and other forest improvements.

Progress of the Survey.

The forest survey and classification of Crown lands continues to progress, 830 square miles having been covered during the past year, so that approximately 30 per cent. of the entire Crown land area has now been covered in this way. The results secured are proving of the greatest value in the every day administration of Crown lands, besides furnishing the foundation for a comprehensive plan for the handling of the Crown forests on a permanent basis. Where licensed lands are included in areas being surveyed, licensees can, upon the payment of certain fees, secure reports on their holdings. The revenue secured in this way is to a considerable extent helping to defray the cost of the survey.

In the soil classification, the Agriculturist of the Commission of Conservation has co-operated by personally directing the work. The object is, of course, to direct settlement to areas suitable for that purpose, while reserving non-agricultural lands for permanent timber production.

The Commission has also co-operated in the study of natural regeneration and rate of growth of commercially valuable forest species, upon which the Forest Service has been engaged. Dr. C. D. Howe, of the Commission's forestry staff, has directed the work in its general aspects. The Commission has further co-operated with the New Brunswick Forest Service and with the Bathurst Lumber Company by furnishing the chief of party for the conduct of an experimental cutting upon the Company's limits. The area in question has been set aside by the Provincial Government as a permanent experimental plot, and the results of the different methods of cutting and of slash disposal will be under careful observation for many years to come.

Professor R. B. Miller of the Forestry Department of the University of New Brunswick having resigned to become State Forester of Illinois, the position has been filled by Professor A. V. S. Pulling. This school has filled and is filling a very valuable service in providing trained foresters, not only for provincial and private work in New Brunswick, but in the other forest services in Canada as well. It is to be regretted that lack of finances has prevented the employment of additional men upon the teaching staff of the Forestry Department.

Incidental to the regular courses of instruction, a forest ranger course for returned soldiers has been maintained by the Forestry Department of the University, in co-operation with the Vocational Board.

NOVA SCOTIA.

Action is still pending with reference to the appointment of a Provincial Forester for Nova Scotia. Particularly during recent months, the matter has been receiving most careful consideration at the hands of the Provincial Government. An aggressive educational campaign has been carried on by the Canadian Forestry Association, calculated to enlist public sup-

port for such an appointment, the need for which has been fully recognized by the provincial authorities. Many of the timber owners and other public-spirited citizens have interested themselves in support of the movement. There now appears to be a very good prospect of an appointment being announced in the near future, which will bring Nova Scotia into line, in this respect, with the other forest provinces of Canada.

IN QUEBEC.

In Quebec, both forest protection and forestry practice continue to make excellent progress. Notwithstanding a season of great fire danger, the four co-operative forest protective associations have come through the year with a distinctly creditable showing. These associations cover nearly 85 per cent. of the licensed Crown timber lands of the province. Outside association territory, the provincial Forest Service has inaugurated a system of forest fire patrol in the Abitibi district, particularly along the Transcontinental Railway, west of Parent. It is announced that the effectiveness of this patrol will be further increased during the coming season by the assignment of additional personnel and equipment.

There is an increasing appreciation of the effect upon the future productiveness of cut-over lands, due to the methods under which logging is carried on. It is realized also that the same rule for cutting is not applicable under all conditions, and that there may be a great waste, under some conditions, from unnecessarily leaving merchantable material uncut, as well as unnecessary injury to future productiveness, by cutting trees which, under other conditions, should be left uncut for seeding purposes or for protection against windfall. The Provincial Forest Service is looking forward to the time when cutting methods shall be in accordance with specific plans prepared at least a year in advance of cutting, on the basis of studies made on the ground by trained foresters of long practical experience. Preliminary studies of this character are already under way, particularly in areas of slow-growing, under-sized spruce, where the operators argue that cutting strictly to the standard diameter limit is not desirable from either their viewpoint or that of the forester.

There is much of promise in the appointment of a committee composed of representatives of the Pulp and Paper Association and of the Limit-Holders' Association, to consult with the provincial authorities relative to suggested changes



The Junior Acme

The Motion Picture Machine Everyone Can Afford to Own.

Takes standard 1,000 foot reels.

Motor Driven. Can be operated from the ordinary electric light.

It has every feature necessary to project a perfect rock-steady clear-cut picture.

Fitted with metal magazines, patented framing and focusing devices. Frames and focuses picture instantly.

Weight, 22 lbs.; Size, 17 inches long, 18 inches high, 7¾ inches wide.

PRICE $150.00.

This price applies only when machine is required for religious and educational work.

Write for descriptive circular.

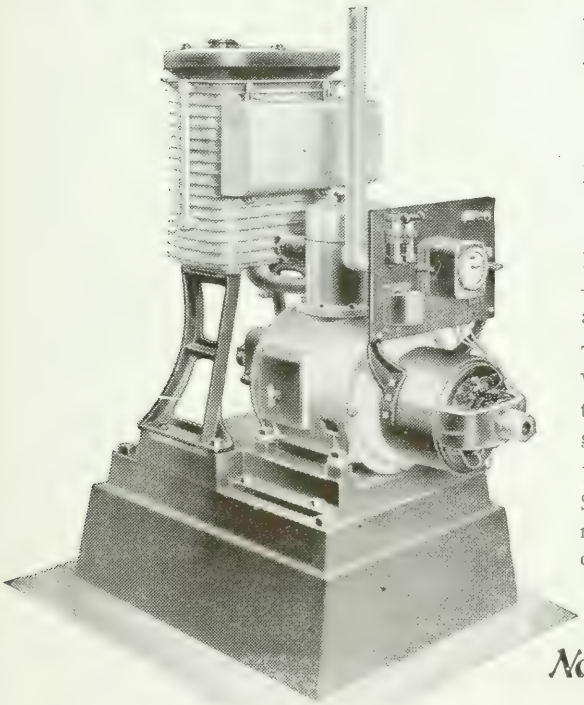
SUPPLIES COMPANY OF CANADA LIMITED

65 SPARKS STREET, OTTAWA, ONT.

Be sure to identify the advertisem ent with Canadian Forestry Journal.

Northern Electric

POWER AND LIGHT



Electric Plants for Every Service
350 to 5,000 watts.

Especially adapted to camps—saw-mills—construction work—stores—farms and all country houses.

This cut shows the Utility model ¾ K. W. usually furnished with storage battery, but obtainable as a one-piece generating unit.

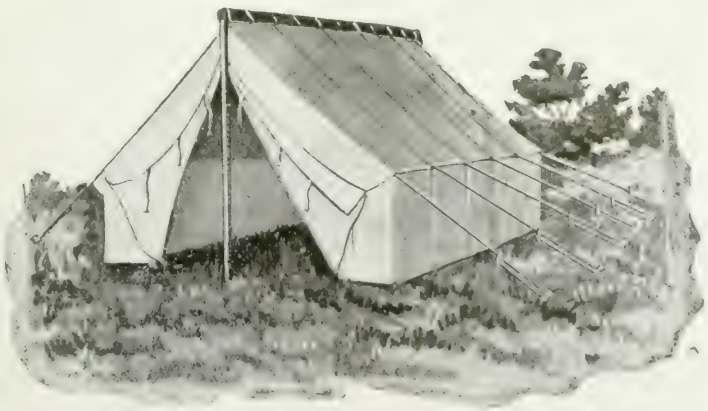
Its features include: Bosch Magneto—S.K.F. Ball Bearings—Electric Governor—and concealed Flywheel—it is self-cranking and stops itself when battery is charged.

Northern Electric Company
LIMITED

Montreal Toronto Regina Edmonton
Halifax London Calgary Vancouver
Winnipeg

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.
Waterproof—Insect proof. Light—Strong—Compact.
Two Colors—White; Green.



WOODS
Manufacturing Co., Limited.

Canada's Largest Producers of Outdoor Equipment.

OTTAWA
CANADA
Dept. D.

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

GAGNON & MORISSETTE

TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES

CHICOUTIMI - - P.Q.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine. Forest Planters Guide Free.

THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.;
Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - - QUEBEC

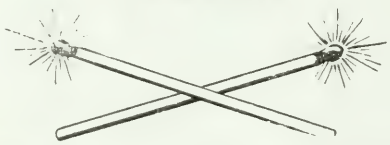
Try This Stump Puller at Our Risk

The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sts.
LaCrescent, Minn.



Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

ASK FOR EDDY'S EVERYWHERE IN CANADA



Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates

JAMES W. SEWALL **Old Town, Maine.**

in policies and procedure, with special reference to the revision of the cutting regulations.

Considerable attention is given by the Forest Service to land classification in advance of settlement. The Provincial Forester reports that classification has been completed on 17 townships, and partial work done in about 30 others. With the prevailing high prices of pulpwood, there is a great incentive for so-called settlers to enter upon well-timbered non-agricultural lands, under the guise of settlement, for the primary purpose of making a profit from the sale of timber, but with no real expectation of remaining after the timber is gone. Past experience proves conclusively the great desirability from the viewpoint of good public policy, of restricting settlement to lands actually agricultural in character. That this rule has been many times violated in the past, in all the provinces, is a matter of common knowledge, with results alike unfortunate for the individual and for the state.

The provincial forest nursery at Berthierville has shipped out during the year a total of nearly one million plants, the great majority of which have gone to pulp and paper companies for reforestation of privately-owned lands. A large extension of this nursery is contemplated to meet the rapidly increasing demands for planting stock in the province.

The provincial authorities have under consideration a plan under which denuded Crown lands of non-agricultural character may be made available for reforestation by private interests, such as the pulp and paper companies. It is greatly to be hoped that some equitable basis may be worked out, which will result in a large amount of forest planting on Crown lands.

The forestry course at Laval University has been materially strengthened by amalgamation with the School of Surveys. Graduates in forestry will thus have also the diploma for land surveyor, and their services will be correspondingly more valuable.

ONTARIO'S PLANS.

The Provincial Government has announced its intention to reorganize the timber administration of the province. It is generally assumed that this will include the extension of the responsibilities of the Forestry Branch to cover at least the technical features of administration as applied to all Crown timber lands. Such a consummation will be greatly in the interest of the province as a whole, as it will be in the best permanent interest of the lumbering and pulp and paper industries

With the single exception of Nova Scotia, all the other forest provinces which control their own resources have regularly established forest services, whose duty, among others, it is to so guide and control the methods of logging as to facilitate, so far as may be practicable, the production of a new crop upon cut-over lands. In Ontario thus far, the timber administration has existed primarily for the sake of collecting revenue and has not contained any men specially trained along forestry lines. The provincial Forestry Branch, on the other hand, employing a number of trained foresters, has had its activities limited primarily to forest protection and forest nursery work. The time has now fully arrived for bringing the forest into first-hand contact with a technical forestry administration, and the declared intention of the Provincial Government along these lines is entitled to most hearty support. The employment of additional foresters will, of course, be necessary.

More Planting of Waste Land.

The Provincial Government has also under consideration the adoption of an extensive program of reforestation. Thus far, the provincial forest nursery at St. Williams, has been primarily engaged in producing planting material for the use of farmers in Old Ontario, and for reforestation at the nursery station. The suggestion is now made that municipalities purchase areas of non-agricultural lands, particularly those subject to damage by drifting sand, and turn them over to the Provincial Government for reforestation by the Forestry Branch. This would be a splendid line of development, and it is to be hoped that such a policy may be made effective. There is also a very large field for future development in the reforestation of denuded Crown lands of which there are very large areas. From one viewpoint, however, it would be illogical for the province to expend large sums of money upon the reforestation of denuded Crown lands, while at the same time perhaps millions of young trees reproduced naturally are being destroyed by fire every year for lack of sufficient funds to provide an adequate patrol. Obviously, so long as it is a question of funds, provision for really adequate protection of the natural forest reproduction from fire should take precedence over a general program of reforesting denuded Crown lands. The money spent on planting up a given area would suffice for protecting many times the same number of small trees over a considerable number of years. It is to be hoped, however, that a modest beginning can soon be made toward the reforestation of denuded Crown lands, this program to be increased with

the increasing effectiveness of protective measures upon Crown lands generally.

The past year has witnessed the retirement of Dr. B. E. Fernow from active service as Dean of the Faculty of Forestry at Toronto University, his place being taken by Dr. C. D. Howe. Dr. Fernow has not only been one of the most useful members of the Committee on Forests, of the Commission of Conservation, but he may also justly be termed the father of scientific forestry in both Canada and the United States. His career has been a long and most useful one on both sides of the International boundary, and it is greatly to be hoped that he may long be spared to enjoy his well-earned rest.

(Continued in April issue.)

DEATH OF W. C. J. HALL.

On February 4th, while at his work in the Parliament Buildings, Quebec, as Superintendent of Laurentian National Park, Mr. W. C. J. Hall passed away suddenly. Mr. Hall was a Director of the Canadian Forestry Association for many years, and on the day previous to his death had been present at the Annual Meeting of the Association, held in the Chateau Frontenac. The late Mr. Hall was the son of Mr. George Benson Hall, a lumberman of high reputation and geat business ability. Mr. W. C. J. Hall joined the Department of Lands and Forests of Quebec in 1892; in 1896 was appointed Superintendent of Laurentian National Park, and in 1905 became Chief of the Forest Protective Service, which position he relinquished about two years ago, continuing his duties as Park Superintendent.

At a meeting of the Directors of the Canadian Forestry Association held at Ottawa, February 17th, the following resolution was passed:

"Whereas, the Directors of the Canadian Forestry Association have learned with profound regret of the death of their fellow director, W. C. J. Hall, whose interest in the Association's work has always been most keen and whose personal participation in the forest conservation cause has been aggressive and untiring;

"Be it resolved:

"That the Directors of this Association place on record their sense of loss at the death of one who rendered such notable service to his Province as a far-seeing and devoted public officer."

"Canoes that have made Maps and History."

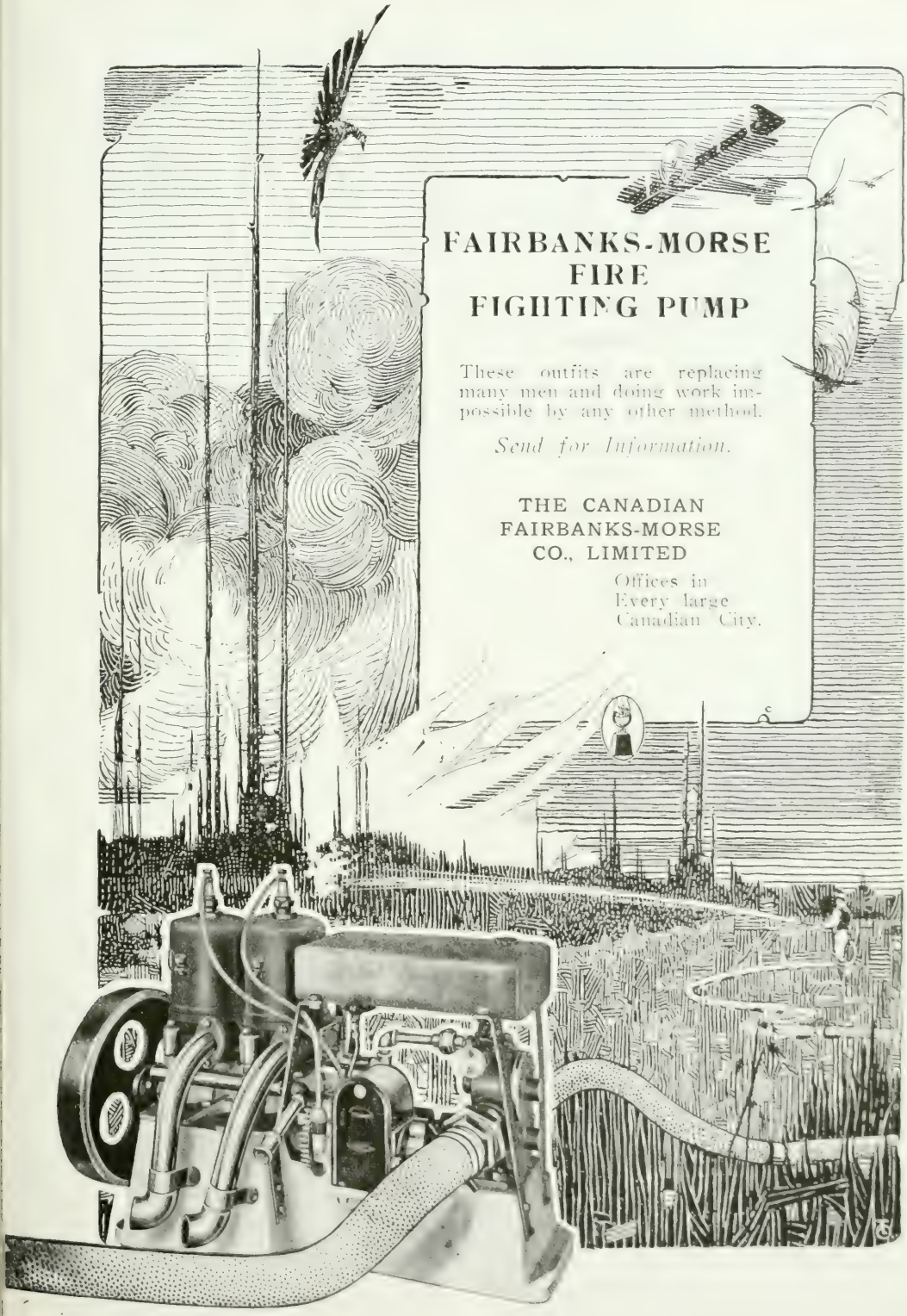
EXPLORERS, TRADERS AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS

When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE & BOAT CO., LTD.

LAKEFIELD ONTARIO CANADA


FAIRBANKS-MORSE
FIRE
FIGHTING PUMP
These outfits are replacing many men and doing work impossible by any other method.
Send for Information.
THE CANADIAN
FAIRBANKS-MORSE
CO., LIMITED
Offices in
Every large
Canadian City.

More Contributing Members Stand by the Association

The following new contributing members of the Canadian Forestry Asociation have been received since the February issue was printed, with the first list.

Each Contributing Member has paid five dollars to the Association to assist its general educational work.

Belgo Canadian Pulp & Paper Co.
John Black
Baird and Peters
Hon. J. P. Burchill
Crown Lumber Co.
A. T. Cushing
Fred J. C. Cox
John Clifford
W. A. Davidson
W. F. C. Devlin
Elliott, Marr & Co., Ltd.
J. Fred Edgett
Geo. F. Edwards
Elder, Dempster & Co.
Finch, Pruyn Lumber Co.
J. H. Francis
G. E. Farlinger
His Honor Judge Farrell
James G. Farish, M.D.
John L. Forler
Leo Frankel
V. E. Fanjoy
John H. Garth
W. E. Golding
Gill and Fortune
W. E. Gunter
Chas. Gosselin
J. E. Guay
G. A. Grierson
Graves, Bigwood & Co.
Chas. J. Herriot
T. M. Henderson
J. Hanbury & Co.
A. E. Hoskin
Gerhard Heintzman
W. E. Hazley
Thos. Hepburn
Dr. C. D. Howe
Geo. Hadrill
P. Hutchison
Walter Huckvale
International Land & Lumber Co.
International Paper Co.
Miss M. C. Irwin
E. R. Jarvis
A. Jephcott
D. A. Kingsbury
Robt. G. Kinsey
A. R. Kaufman
Samuel King
James Kynoch
Walter E. Lyman
A. E. Loosen
Arthur Lyman

WANTED

150 lbs. White Spruce Seed
(Picea Canadensis)

LINCOLN WOOD PULP CO.

Box 923 BANGOR, MAINE

LUMBERMEN ATTENTION!

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,
BATHURST NEW BRUNSWICK

HIBBERSON BROS.
Forest Engineers and Surveyors

Cruising, Mapping, Logging Costs, Flumes, Rogging R.R's.

Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.

Fifteen years experience cruising British Columbia Timber.

Suite 701-5 Belmont House, Victoria, B.C.



A forest fire commencing on the shores of One-Island Lake, north of Port Arthur, Ontario. Photograph by kindness of Messrs. Phillips and Benner, surveyors and engineers, Port Arthur.

M. Langmuir
James Ludgate
J. Laurin
Wm. Little
John A. Lang
T. A. Lamb
H. L. Martin
Geo. S. McClearn
A. D. MacTier
Sir John Stirling Maxwell
W. A. Matheson
J. A. McGowan
F. W. Molson
Wm. J. Pulling
Robt. Quance
Wm. Russell
P. D. Ross
Robinson & Co.
Rat Portage Lumber Co.
C. W. Scott
Henry Sproatt
Terry and Gordon
T. S. Simms Co., Ltd.
John G. Turnbull
S. D. Trethewey
C. N. Vroom
. V. Vroom
Western Retail Lumbermen's Assn.
A. C. Wieland
S. Casey Wood
H. H. Williams
John S. Whyte.



QUEEN'S
UNIVERSITY
KINGSTON,
ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL
July and August.
NAVIGATION SCHOOL
December to April
GEO. Y. CHOWN, Registrar.

Tying Down Exchange Rates With Paper Cargoes

From an Address by J. A. Bothwell, before Canadian Pulp and Paper Association

"I have just been shown advance returns from the census of the Canadian pulp and paper industry, taken by the Government, covering the year 1918, shortly to be published. In that year, our industry represented a capital investment of $241,708,223. Our products for the year reached a value of $119,309,434; the number of persons employed, exclusive of woodsmen, was 25,863, and the amount paid out in wages and salaries, $26,974,226. Our exports of pulp and paper during the current fiscal year will approximate $100,000,000 in value. More than 75 per cent. of these exports are marketed in the United States. We are contributing upwards of $333,000 a day for every working day in the year to Canada's foreign exchange and helping, to that extent, to overcome our adverse trade balance with the United States."

CEDAR
We are in the market at all times for clear EASTERN Cedar. We also buy clear cedar lath, special sizes.
If you are cutting any cedar write to us for particulars.
PETERBOROUGH CANOE Co. LTD.
PETERBOROUGH CANADA

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador
Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

THE UNIVERSITY OF TORONTO
AND
UNIVERSITY COLLEGE
WITH WHICH ARE AFFILIATED
ST. MICHAEL'S, TRINITY and VICTORIA COLLEGES
Faculties of
ARTS MUSIC MEDICINE
EDUCATION APPLIED SCIENCE FORESTRY
Departments of
HOUSEHOLD SCIENCE SOCIAL SERVICE
For information apply to the Registrar of the University, or to the Secretaries of the respective Faculties.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities

Corporation
Limited

MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG.

FACULTY OF FORESTRY
MAY 9 1920
UNIVERSITY OF TORONTO



Canadian Forestry Journal

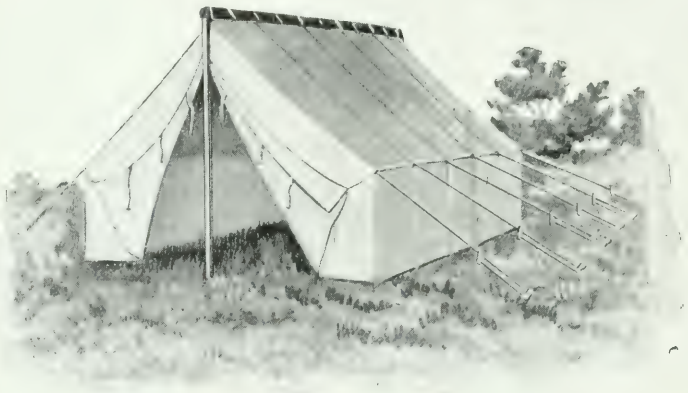
April 1920

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

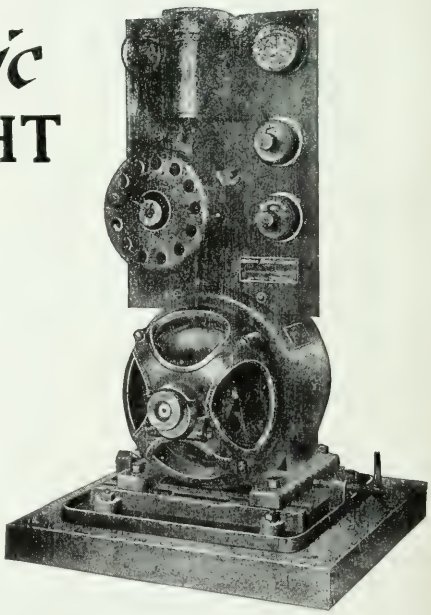
OTTAWA
CANADA
Dept. D.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

Mention the Forestry Journal for your identification.

IRCULATION: 11,500 COPIES MONTHLY ROBSON BLACK, EDITOR

Canadian Forestry Journal

VOL. XVI. OTTAWA, CANADA, APRIL, 1920. No. 4

Tree Fences to Block Snow and Sand



by B. M. Winegar, Montreal

How the Railways are Coming to Use More Plantations in Place of Unsightly Boards





A plantation of Carolina Poplar set out in 1916 to prevent the drifting of sand near railway tracks. These cuttings were about half an inch in diameter and 12 inches long. They cost about two cents apiece. Picture was taken one year after planting.

Railways use two kinds of fences for snow, a portable one which can be shifted any distance from track and a permanent one which is established on the right-of-way line. The former fence is taken down in the spring and piled up until fall. The advantage of this type of fence is obvious, being built in 12-14 and 16 ft. panels, it is easily handled. The maintenance, however, is very high, and the expense necessary in moving considerable. The temporary fence, however, is unsightly. Tree fences recommend themselves on account of their original cost, the small maintenance expense involved after plantations have been established several years, and because of their appearance. Their disadvantage is their lia-

bility to fire. Extra precautions are necessary on the part of the track forces to keep fire from getting into the plantation.

There are some fine examples of tree fences in the orchard belt of Ontario. Some of these fences have evidently been located at least fifty years. On the wind swept prairies too, settlers have found trees an excellent protection both in winter and in summer.

Tree Fences Are Now Cheap.

Railway officers have been aware of the practicability and desirability of this type of fence for some time but the price of lumber and posts, until recently, has not made tree planting very attractive. However, tree planting today, in Eastern Canada, can be done for less than one half the cost of wooden fences. Live fences are effective and economical. After the third and fourth year, no maintenance is required. They are decorative and do much to make the right of way attractive.

Planting has been done very successfully by the Intercolonial in northern New Brunswick, since 1887 Here the local red spruce has been dug up from nearby fields and transplanted. This work is still being carried on.

When the trees reached a height of 9 feet to 10 feet, the tops are trimmed. Trees from 18 inches to 36 inches in height have been planted in two rows. From time to time any failures have been taken out and replacements made. This is perhaps the most striking example of just what can be done along this line.

The Canadian Pacific and the Soo line have been planting for a number of years in the prairie country. Moisture conditions limit the varieties to deciduous shrubs and trees. From six to eight rows of shrubs and trees are required. Locust, carragana, willow and poplar are the species used Attempt is being made after the plantations have been several years located, to interplant with spruce.

Pine and Spruce are Best.

The ideal snow fence appears to be the white or red spruce of this country, or the Norway spruce, planted two or three rows staggered. The trees hold their foliage well to the ground. They grow rapidly making from 10 to 16 inches annually, after having become established. They make an excellent snow barricade and are striking in appearance.

Balsam, though of a more rapid growth than spruce, is subject to more enemies, is considerably more brittle, and is not so satisfactory in holding its lower branches. It should do well, however, in mixture.

Cedar is used extensively, and although of slower growth than any of the other species planted, when once established, does extremely well. It makes an even more artistic show than perhaps any of the other species.

North of Lake Superior and west to the prairies where jack pine predominates, the use of this tree is to be recommended. It is of quick growth, but has the drawback of losing its lower branches quickly, especially when planted close. It should be used in mixture with spruce, balsam or cedar. Norway pine has the same growing characteristics, but like the Jack pine, it will probably do well in mixture. Use of hemlock has been recommended, but it would appear the least satisfactory of all trees mentioned.

Generally it can be stated that the best conifers to plant in any locality are the trees which thrive there under natural conditions.

It requires seven years at least to get sufficient growth to make effective snow breaks.

The factors which effect the cost of planting trees and on which success of the plantations depends are, first: the distance which trees have to be hauled. If it were possible to lift trees only a short distance, say within half a mile, the loss would be greatly reduced. It is obvious, however, that where trees are transported from wagons to cars and then taken to destination, drying out of the roots occurs, and the loss is greatly increased.

Proper weather conditions are necesary for this work. Trees which are handled in cool, damp weather have a much better chance than if transplanted when weather is dry and hot.

There has been much discussion as to the time when trees should be planted. Successful work has been done in the spring, and again from the middle of September till heavy frost sets in.

Where soil is very heavy and difficult to work, and where heavy boulders are found, the expense is greater and the difficulty of establishing plantations much increased. If it is necessary to use a spade to work the ground, roots of the trees are much more likely to get insufficient space than where ploughing is done.

The following methods have been suggested for establishing tree fences. Trees are planted from 2 feet to 2½ feet apart in rows. These rows are from 2 feet to 3 feet apart. Two to three rows are necessary.

Nursery stock being impossible to obtain at reasonable figures, we are forced to depend largely on trees dug from the wood. Greater loss is anticipated from this class of material.

The smaller the trees planted, the greater the chance for success. The cost of lifting smaller trees and planting them is much less than the expense involved in lifting bigger stock. It is not practical, however, to use large trees. The expense would be too great, and handling and loss very high. Even nurseries do not handle large conifers except at a prohibitive rate. Nursery stock is, of course, much more easily handled than wild grown trees. It appears to be good practice when natural grown stock is used to plant trees from 18 inches to 36 inches in height.

Cutivating the Ground.

The ground to be planted is prepared in the spring or fall preceding the planting. Ploughing is done and a disc is used. If trees are to be planted in the fall, the ground should be cultivated during the summer season to keep down the weeds. It appears to be good practice to plough a strip about 12 feet wide, three feet of the plantation on either side being left for fire breaks. It is necessary to keep these fire breaks maintained for several years. Cultivation should be done for at least three or four years. Extra precaution should be taken to see that grass fires are not let run close to trees.

In 1916 the Canadian Pacific having experienced considerable trouble with hot boxes, caused by drifting sand, established a plantation at Vaucluse, on the line between Montreal and Quebec. Carolina poplar cuttings and Scottish pine seedlings were used; 80% of the cuttings have made a showing and are now growing at the rate of about three feet annually. There was no loss in the pine trees. They now average over 12 inches per year. This plantation is effective as a sand as well as snow break.

It is recommended that for this class of work only conifers be used, deciduous trees being of value in summer time only.

N. B. FORESTERS' RECORD

At the annual Hammerfest of the Forestry students of the University of New Brunswick, Mr. G. H. Prince, in the course of an address said the University of New Brunswick had graduated twenty-eight foresters in the nine years that degrees have been granted to foresters. Almost all of them were still in the profession and sixteen of them held important executive positions in Canada with the federal and provincial governments while several others were practicing the profession in other parts of the world. Mr. Prince expressed the hope that the University would continue to supply the profession with men of ability.

THE FOREST IN THE LEAD.

The value of all the field products of Northern Ontario in 1917 was $7,041,327.

The value of the forest products of Northern Ontario in 1918 was over $22,000,000.



Courtesy "The Aeroplane in Canada."

An example of the infinite detail obtainable in Aerial Photo-Topographic l work—although the picture loses considerable detail in reproduction, the different varieties of trees and crops can be discerned. In one instance even the furrow-marks in a recently ploughed field are hown.

To transform a continuous series o these pictures into a correct map of the country, involves consideration of the levations at which each picture was taken and degree of inclination from the horizontal plane as well as other features of a highly technical nature.

A simple mosaic is not a true record but an absolutely correct scale map can be made from aerial photographs, giv n the necessary data and technical skill This method is many times quicker an cheaper than those at present employed.



Scenes on the Quesnel River, British Columbia.





BURNED MANY TIMES.
Note the number of stumps and the absence of reproduction.



GENERAL VIEW OF AN AREA BURNED REPEATEDLY.
Forest growth scattered. Note the soil erosion.

THE PROFITS OF TREE PLANTING IN FRANCE

by Dr. B. E. Fernow

The movement for recovery of waste lands in France dates from the beginning of the 19th century, and today reforestation by state, communal and private effort, encouraged by legislative acts during the last sixty years, has restored more than 2,500,000 acres of lost ground to forest production.

There are four definite regions of large extent in which systematic effort in this direction has been made, namely, the sand dunes of Gascony the Landes of South-western France the sandy plains of La Sologne, the limestone wastes of Champagne, and the mountain slopes in the Vosges and Jura-Alps.

The sand dunes on the coast of France comprise around 350,000 acres; those on the coast of Gascony, in South-western France, alone have an extent of nearly 250,000 acres, these being the most important and having for a long time endangered the adjoining pastures and fields. It seems that the land occupied by dunes was originally forested and that these were created by deforestation.

As early as 1717 attempts at reforestation were made by the inhabitants, and from that time on small plantings were sporadically made. But the inauguration of systematic reforestation was begun only after a notable report by Brémontier, who in 1786, secured, as chief engineer of the department of Bordeaux, a sum of $10,000 to be employed in ascertaining the possibilities of making a canal through the Landes and of fixing the dunes. As a result of this beginning, the method for their recovery having been by 1793 experimentally determined by Brémontier, 275,000 acres of moving sand have been fixed during the last century. The revolutionary government in 1799 created a Commission of Dunes, of which Brémontier was made president, an annual appropriation of $10,000 was made, later (in 1808) increased to $15,000. In 1817 the work was transferred to the Administration des Ponts et Chaussés. The appropriations were increased until in 1854 they reached $100,000 a year, and in 1865, the work being nearly finished, the dunes were handed over to the forest administration. There being still about 20,000 acres to be recovered, this was achieved in 1865, when 200,000 acres had been reforested at an expense of about $2,000,000, and an additional expense of $700,000 to organize the newly formed pine forests. These, at present with their resinous products and wood are furnishing valuable material. An unfortunate policy of ceding some of these forest areas to private and communal owners was inaugurated just as the planting was finished, so that at present only 135,000 acres remain in the hands of the state. The returns from the sales, however, reimbursed the cost of the reboisement in excess by $120,000, so that the state really acquired for nothing, a property, now estimated to be worth $10,000,000.

Another Forestation Success.

To the eastward of this region of dunes stretch the so-called Landes, a territory triangular in shape, containing 2,000,000 acres of shifting sands and marshes, on which a poor population of shepherds (on stilts) used to eke out a living. In 1837 an engineer of the administration of bridges and roads conceived the idea of improving this section by reforestation and at his own expense recovered some 1,200 acres in the worst marsh by ditching and planting. The success of this plantation invited imitators, and by 1835 the reforested area had grown to 50,000 acres. This led in 1857, to the passage of a law ordering forestation of the parts of the land owned by the communities, the state at the same time undertaking the expense of building a system of

roads and making the plans for forestation free of charge. The communities were allowed to sell a part of the reclaimed land in order to recover the expense. From 1850 to 1892, private owners, imitating the government and communal work, [illegible] 750,000 acres were covered with pine forests at a cost of $4.00 to $5.00 per acre, or, including the building of roads, a total of around $10,000,000 had been expended. In 1877 the value of the then recovered area was estimated at over $40,000,000, this figure being arrived at by calculating the possible net revenues of a pinery under a 75 years rotation, which was figured at $2.50 per acre, with a production of 51 cubic feet per acre, and 200 quarts of resin (at $3). An estimate of recent date places the value of this area at $100,000,000.

How French Forestry Makes Money

Centrally located between the valleys of the Loire and the Cher, near Orleans, lies the region of La Sologne a sandy, poorly drained plain upon an impenetrable calcareous sub-soil giving rise to stagnant waters; this region too, had been originally densely wooded, and was described as a paradise in early times; but from the beginning of the 17th century to the end of the 18th it was deforested, making it an unhealthy, useless waste. By 1787, 1,250,000 acres of this territory had become absolutely abandoned. About the middle of the 19th century a number of influential citizens constituted themselves as a committee to begin its work of recovery, the Director-General of Forests being authorized to assume the presidency of that committee. As a result a canal of 25 miles in length, and 350 miles of road were built, and some 200,000 acres (all non-agricultural lands) were planted with Maritime and Scotch pine, the state furnishing assistance through the forest service and otherwise. A set-back occurred during the severe winter of 1879, frost killing many younger plantations, which led to the substitution of the hardier Scotch pine for the Maritime pine in the plantings. The cost per acre set out with about 3,500 two-year old seedlings amounted to $5.00. An estimate of the value of these plantations places it at $18,000,000, so that lands which 50 years ago could hardly be sold for $4.00 per acre, now bring over $3.00 as an annual revenue.

In the province of Champagne south of Reims, arid limestone wastes of an extent which in the 18th century had reached 1,750,000 acres, are found. About 1807 the movement for the recovery of these wastes began first in a small way, gaining strength by 1830 after some sporadic experiments had shown the possibility of reforestation, and today over 200 000 esting to note that land which 50 years ago was often sold without measurement by distance, "as far as the cry would carry," and never for more than $4.00 per acre, is today worth $40.00, at a cost for planting of less than $10.00. The stumpage value of a thirty years' growth is figured at from $50 to $$100. the total forest area is valued at $10,000.000, with net revenue from the 200,000 acres of $2.00 per acre.

PENNY WISE--POUND FOOLISH

(Pacific Coast Lumberman.)

The recently announced resignation of Colonel Henry S. Graves, as Chief Forester of the United States, brings once more to mind the stupidly parsimonious scale of salaries paid in the forest branches of our own Civil Service.

Sometimes we are forced to the opinion that only the least intelligent men find their way into the high places of government. It is an unpleasant thought! Yet what else can we think, when we find government administrative heads seemingly unable to understand that low salaries on responsible posts mean book economies only — that away from the soothing figures of the accountant they nearly always mean great losses to the nation through inefficiency, dissatisfaction and the never-ending disorganization caused by a frequent change of personnel.

Sir Andrew's Forest Obsequies

When the President of the Canadian Pulp and Paper Association is persuaded to deliver an address before the Academy of Medicine on the Thyroid Gland, perhaps the newspapers will give the delivery as much publicity as the recent speech of Sir Andrew MacPhail on Forestry. Sir Andrew is professor of "The History of Medicine," at McGill Universiy. He spoke before the Canadian Pulp and Paper Association on the economics of forestry and repeated the address before a Toronto audience. Probably five thousand people read parts of the address from newspaper columns to a hundred who sat beneath the speaker. The effect of the deliverance has been in direct ratio to Sir Andrew's standing as a scientist and editor, and without relation to his scholarly inexperience in the technical subject with which he chose to deal.

The Forestry Journal has not the slightest intention of considering the address seriously. We give below certain excerpts typical of Sir Andrew's conclusions. There are many men in Canada who hold such fragile opinions, men who have picked up a bit here, a bit there, but who do not muster enough audacity to put the product forward as a treatise on a complex subject, tested by two centuries of scientific effort, and by half a dozen great nations.

No, Sir Andrew, the principles of forestry, applied to the forest have given one European nation a forest property worth seven billions of dollars in not more than one hundred years. She grew it from stuff as promising as the Duck Mountain Reserve in Manitoba, if you've seen that. We can do things equally great in Canada. To suggest nowadays that Canadians have deliberately built up a pulp and paper industry with 250 millions invested, and an export business of 100 millions a year, only to sit in the parlor car and watch the forests disappear and the mills rot.—No, Sir Andrew, that is almost improbable. It happens in Tien Tsing, but nowhere near Three Rivers.

"So you must not be too disconsolate and think too much of the end," advises the good physician.

Once a train came rushing toward a river bank; its speed was fifty miles an hour. Surely it must plunge to a fearful destruction! The faces of all beholders were blanched with terror. But it was all for naught. The train happened to find a bridge and passed across the river without vibrating a teacup.

There was a bridge in front of your eyes all the time you were speaking, Sir Andrew, but you couldn't see it. It was hidden by a Tree. R. B.

The Doctrine of "All Is Lost"

(Excerpts from Sir Andrew MacPhail's Speeches)

"About a year ago, after five years' absence, I came back and looked upon these woods. I found that what had happened was precisely what had happened throughout the whole of Canada; that the wood had been decaying, and into the holes caused by this decay had come disease, because that is the law. That is the law of human pathology, as well as the law of the forests, that wherever you have age, and wherever you have sickness, and wherever you have age and weakness, disease will follow in its train. . .

"If you are disposed to ask advice, the advice that one would give you would be to continue in your work, get rid of all the pulp wood that exists as quickly as possible, for this reason, that if you don't, it will only perish, and we of this generation might just as well get what we can out of it.

So, sir, count all that you make as just that much to the good, and when it is finished, whether it be six years or in three hundred years, what then will come? Observe this: There are two things which you have never seen—one thing that is as good as it looks, and another thing that is as bad as it looks. That is true of the pulp and paper industry, and if it would all disappear the situation would not be as calamitous as you might suppose. . . .

"So you must not be too disconsolate and think too much of the end and when that end will come, and I have no doubt, whenever that end does come, that you will be able to put your mills and your plants to other good purposes. Nor need we of this generation concern ourselves too much about the future. We have done our part in the world, and let those who come after us do their share, and if they look into your records they will find that you tortured and tormented yourselves into finding a solution."

The Tree Nursery at Indian Head

The tree nursery at Indian Head, Sask., comprises three-quarters of a section lying about two miles south-west from the town of Indian Head. This section was originally school lands. In 1903 arrangements were made for the north-east quarter of this section to be taken over by the Department of the Interior for nursery purposes. A few years later, as the work extended, the north-west quarter was added, and again a few years later than this the south-west quarter was again added.

The general character of the land is somewhat rolling and the soil a moderately heavy sandy loam. There is a deep coulee running through a portion of the property on which a dam has been established, and there are several small natural bluffs of poplar scattered here and there, which add some natural attractions to the site.

The first buildings were erected in the summer of 1904, and the first plantings, consisting of an outside shelter belt on the north-east quarter the grading of the roads and the planting of the ornamental grounds was done in the spring of 1905. This quarter was gradually gotten under cultivation, and the whole of this quarter is now devoted to the growing of nursery stock with the exceptions of such portions as are occupied by the buildings, ornamental grounds and permanent shelter belts.

The nursery plots, consisting of regular sized plots of approximately one to two acres, are divided by caragana hedges for shelter purposes. The ornamental grounds consist of a main entrance drive approximately a quarter of a mile in length, bordered on each side by plantings of ornamental flowering shrubs, evergreens and hardy trees. In the neighborhood of the buildings fairly extensive lawns were laid out, and these are bordered by ornamental shrubs, perennial plants and so on.

The buildings on the north-east quarter are well sheltered by permanent belts consisting largely of conifers, which have developed wonderfully in the past few years.

The south-west quarter, which was taken over most recently, is rather rougher than the other land and has more waste land on it in the nature of sloughs, and some alkali spots, and up to the present has been devoted entirely to the growing of grain and hay for the horses needed on the nursery for labor purposes. The whole of this new quarter is not yet entirely under cultivation.

There is now a very satisfactory equipment of buildings, consisting of the Superintendent's residence, foreman's residence, two boarding houses stable, two packing sheds and one workshop. Being connected up with the pipe line which supplies the town of Indian Head, there is a supply of very good water, but at times the supply is not any too plentiful. There is also an individual electric lighting plant to furnish light to the buildings.

How Paper is Made

By J. N. Stephenson, M.S.
Editor of the Pulp and Paper Magazine of Canada

An Interesting Description Following the Process from the Tree to the Finished Roll

To tell how paper is made in the space of a brief article is a difficult problem, but it will be possible to describe at least some of the more important and interesting features of the manufacture of Canada's most important manufactured product. Canadian paper mills manufacture every standard grade and many special varieties of paper, but the kind which makes up the greatest part of the production is newsprint paper. The annual output of newsprint is not at the rate of 800,000 tons, and within another year will be 900,000 tons, or more. It is this kind of paper which doubtless is most interesting to readers, because about 15 per cent. of the output is used for printing the news of the day in Canadian newspapers, and the rest is exported principally to the United States at a rate which practically amounts to the shipment of $5,000,000 of gold each month, with a consequent stabilizing effect on the rate of exchange. It will be appropriate therefore, if this description is limited to the manufacture of newsprint paper, although the making of other grades involve processes and machinery of a most interesting character which cannot be explained here.



A river of wood destined to feed the daily demand for 40 million newspapers in Canada and the United States.

The manufacture of newsprint paper begins with the tree, so that it is of the greatest importance to take good care of Canada's forests, whose spruce and fir form the foundation of the paper industry. When the wood arrives at the mill, either by floating down the rivers or hauled by rail, it must be sawed into blocks from two to four feet long, and the bark removed. For newsprint paper this is usually done by tumbling the blocks in huge barrels made of steel angle irons. Part of the barked blocks go to the groundwood mill and the rest to the sulphite mill, since newsprint paper contains approximately 80% of groundwood pulp and 20% of sulphite pulp.

Making Pulp on a Grindstone.

In the groundwood mill the blocks are held by hydraulic pressure flat against a revolving grindstone, and the fibres are rubbed off. Everything that was in the wood — and often other things besides, remains in the pulp. The pulp from the grinders is mixed with water and screwed through strainers to remove big slivers, knots, etc., and most of the water is then removed to make less material to handle. In some plants the thick pulp is pumped directly to huge storage tanks in the paper mill or further dewatered and formed into sheets which are folded into bundles or "laps" containing about 35% fibre.

Wood is Cooked to Make Sulphite Pulp.

The first operation in the sulphite mill is to chip the blocks into small pieces to facilitate the penetration of the cooking liquor. The liquor is prepared by burning sulphur and dissolving gas in lime water or in water which is trickling over limestone in a tower. The solution is bi-sulphite of calcium, hence the name "sulphite" for this kind of pulp.

The chips and cooking liquor are fed into huge boilers or digesters. The cooking is done by steam for about eight to ten hours. By this process about one-half the solid matter in the wood is removed, leaving only the comparatively pure cellulose fibre. A cord of wood yields approximately one-half ton of sulphite pulp, while the same cord would yield about a ton of groundwood pulp.

When the cooking is complete the chips are blown from the digester to a blow-pit where they strike a plate and are broken down to a pulp form. The pulp is washed to free it from residues of the cooking liquor, and the non-cellulose constituents of the wood. After being washed, the processes of the screwing, thickening, etc., are practically the same as for ground wood pulp.

The Paper Mill is an Interesting Place.

One would hesitate to believe that the milky-looking liquid passing the paper machine screens, through slats only ten thousandths of an inch wide, could possibly be formed into a product which could be used for printing the daily news or for wrapping a parcel. Yet such is the perfection of the paper machine and the skill of the paper maker that this wonderful result can be accomplished with individual fibres averaging only an eighth of an inch, or less, in length.

In the most modern mills, where the production is kept high and manufacturing costs low, the pulps are simply run from the "slush" storage, in the proper proportions, into large mixing tanks, from which it goes to the paper machines. Many mills still use the original mixer, the beater, and necessarily so where the pulp is handled in laps. In the beater the fibres are brushed and rubbed between a revolving roll and a stationary plate, a process which, besides mixing the fibres, improves their papermaking quality.

The mixed pulps or "stuff" is run into storage tanks, called stuff chests, in the machine room and pumped to a regulator which allows just the right amount to flow continually to the paper machine, the excess going back to the chest. Before the stuff



Log Hoist and Slasher House at the receiving end of a Pulp Wood Storage System.



A travelling conveyor which is moved on tracks along the face of the block pile is frequently used where wood is brought in on cars and in some cases also for stacking the wood on either side of the conveyor which carried the blocks to it.

reaches the machine it is again strained or "screened," to make sure the fibres are of uniform size, and extra water is added to get the proper interweaving of the fibres as the sheet of paper is formed.

A glance now at the picture of a paper machine will 'give the reader an idea of the nature of the apparatus and the order of events. The machine used for making newsprint, book, wrapping and writing papers is called the Fourdinier, from the name of the two brothers who bought up and developed the original patent of Louis Robert, whose invention dates from 1799, only 120 years ago. In that time wonderful improvements have been made, modern machines making a sheet of paper 15 feet wide at the rate of 650 feet or more per minute. Some machines run more than 800 feet per minute, and the

A pretty good firm is Watch & Waite,
And another is Attit, Early & Layte;
And still another is Doo & Dairet;
And one of the best is Grinn & Barrett.

(Martin's Papyrus.)

paper is carried automatically from one end to the other.

A Marvelous Machine.

The wire part of the paper machine is the most important and the wire cloth is the most expensive item of supply, costing as much as $800 or $900 for 160″ machines, and lasting from three days to three weeks.

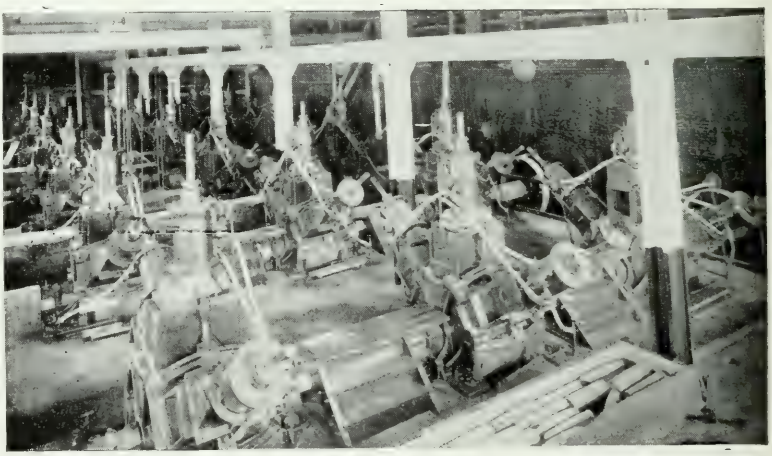
As the stuff flows out on the endless wire it contains about one part of fibre and 200 parts of water. It flows out on the moving wire at nearly the same rate as the latter travels. No sooner does the fluid spread out on the wire than the water starts to go through. Before this has proceeded very far, however, the fibres, in settling, have had a chance to interweave. The fabric is not of uniform strength in both directioss, because the fibres have a tendency to lie in the direction the stream is flowing, therefore the paper is weaker across the machine than parallel to the direction of flow. Hence the paper tears more easily one way than the other. In slower running machines it is possible to make a paper of nearly the same strength in both directions.

Due to the speed of the machine and the limited length of the wire, only a portion of the water can drain through. An additional amount is drawn out by suction, applied through



THE SAW DECK OF A PULP MILL.

Full length logs are seen coming through the doorway, and as they are carried forward by chain conveyors, are cut by the gang of saws into the required lengths, which may be 24, 32 or 48 inches. In the foreground is a man sharpening one of the huge saws with an electrically driven emery wheel. From this point blocks are conveyed to the block pile for storage, or may first be sent through the barking department.



This is a picture of the grinder room of a mill making mechanical pulp. The wood is seen floating to the grinders and in each of the second and third grinders in the first row a pocket is opened ready for wood to be charged The door is then closed and water pressure forces a piston down against the wood, which is thus held firmly against the rotating stone, the lower edge of which is seen on the second stone. Under this is a pit to catch the fibres as they are ground off the log by the stone and washed from the stone by a stream of water.

suction boxes with perforated tops, over which the wire travels. Before leaving the wire the paper passes between a pair of rollers, called "couch rolls" which press the fibres together and squeeze out more water. In some machines, a suction roll is used at this point. It is this roll or the lower one of the pair, which drives the wire.

The paper is now made, so far as the interweaving of the fibres is concerned, and it contains about 90 per cent. of moisture. In order to improve the firmness, texture and finish and to remove more water, the sheet is passed through several pairs of "press" rolls, carried by fine woollen felts.

Evaporating the Water,

Most of the water is removed by evaporation, the paper passing over steam-heated drums called "dryers." This, of course, is expensive, so as much water as possible is removed by mechanical means, although the best that can be accomplished is to deliver a sheet about 35 per cent. dry to the dryers. As the finished paper will contain from seven to ten per cent. of moisture, nearly two tons of water must be evaporated.

Smoothing the Surface.

The finishing, or smoothing of the surface, is done by the part of the machine called the calender, a stack of nine to thirteen special steel rolls. The friction and weight of the rolls on the paper as it winds down through the stack really "irons" out the roughness, presses down the frizzy fibres and gives a surface flat enough to take the ink properly from type and cuts in the press room. The endless sheet is then wound on reels and from these, in turn, is passed through a set of rotary shears that divide it into strips of the proper width, and these strips are wound on cores in rolls of the correct width and diameter, for the newspaper presses. Any breaks are carefully joined and a "flag" or signal is placed in the roll at that point to warn the pressman of some defect in the roll. Wrapping the roll is comparatively simple, yet this and the loading into the cars must be conscientiously and carefully done if the paper is to arrive in good condition.

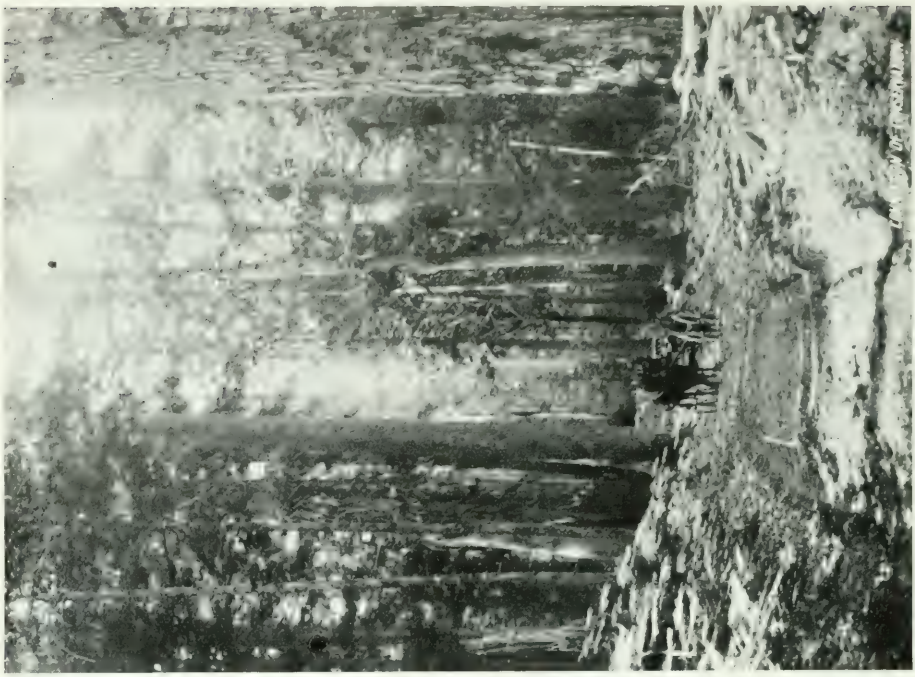
Some newspapers require paper in sheets. To accommodate them the mill must have another department, where the paper from the rolls is passed through a cutter, whose revolving knife cuts the strip into pieces the desired length. The sheets are then counted by reams and packed in bundles.

For special effects an extra high finish is sometimes required. To get this, the strips are passed through the super-calender, a calender stack made up of alternate rolls of steel and compressed paper or cotton. A very high luster can thus be obtained, the paper often going through several times. The product is called "super news" and is largely used for pictorial sections of the paper.

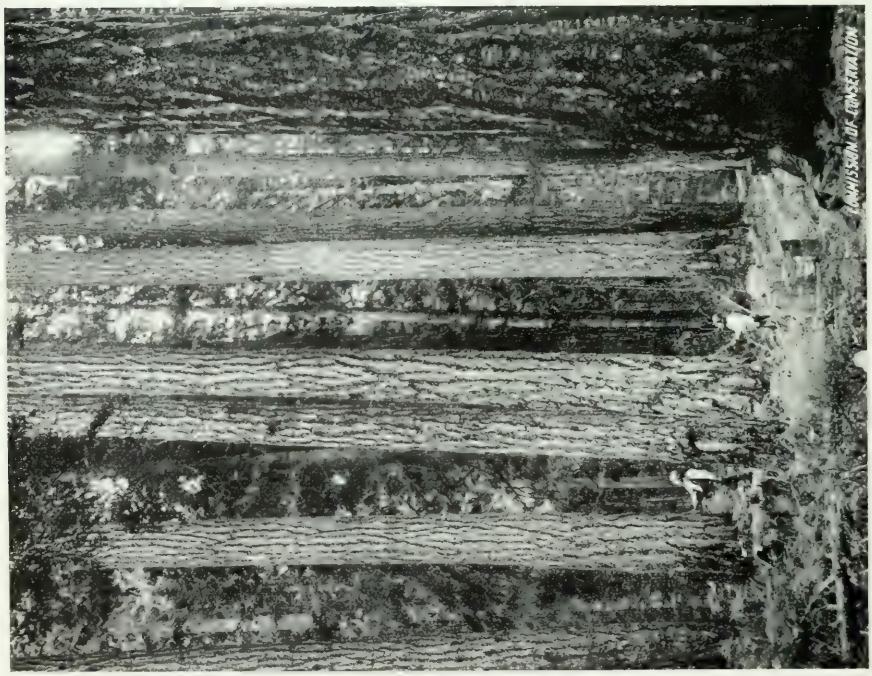
When it is necessary to produce a special color or some other effect requiring a fundamental treatment of the stock, the necessary materials, color, sizing, clay, etc., are added in the mixer or the beater.

For other grades of paper, the operation of the paper machine is practically the same as described, but such papers usually require special additional processes for the preparation of the raw material and the finishing of the paper. The selection of stock is of greatest importance, and more care is required at most points in the process.

Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.



Sit a Spruce and Cottonwood in Skeena Valley, B.C.



Douglas Fir in Fraser Valley, B.C.

The Forester's Task in the Prairie Provinces



With Careful Management Canada Can Build Up the Rich Forest Properties Achieved by Europe



During the late war the woods of England, the plantations of Scotland and the carefully managed forests of France and Belgium were for many months felled as fast as axe and saw could cut, for use in the trenches and the many other uses that the war had for wood. The question confronting those countries today is, how are these forests to be replaced, and how is the demand for wood in the future to be met. These questions are occupying minds not only in those countries, but also in countries that will have to help in providing the supply.

We used to believe that Canada's timber supply was inexhaustible, now we know better. While our information regarding the quantity of remaining timber is not yet complete, we have, however, progressed sufficiently far in our investigations to know that our supply of timber is definitely limited.

Our saw timber resources have been estimated at various quantities ranging from 500 billion feet board measure, to 9,000 feet board measure. These figures convey little idea until we learn that the largest of these estimates is not more than would be consumed by the United States and Canada together at their present rate in twenty years. Canada's timber, therefore, is not more than enough to supply the demands of this continent for more than twenty years, provided that during this period we lost no standing timber by fire. As a matter of fact our losses by fire are still large.

Can Wood be Replaced?

It might be pointed out by some of you that in many respects wood is being replaced by other materials. To a certain extent this is true, but figures, as far as we have been able to get them, do not bear out the view that the use of wood is decreasing. For some uses there has been a decrease, but to counteract this, new uses are constantly opening up. A list of a few of these new uses include artificial silk, imitation leather, paper towels, cardboard packing cases, insulation for electric cables, wooden paving blocks, etc.

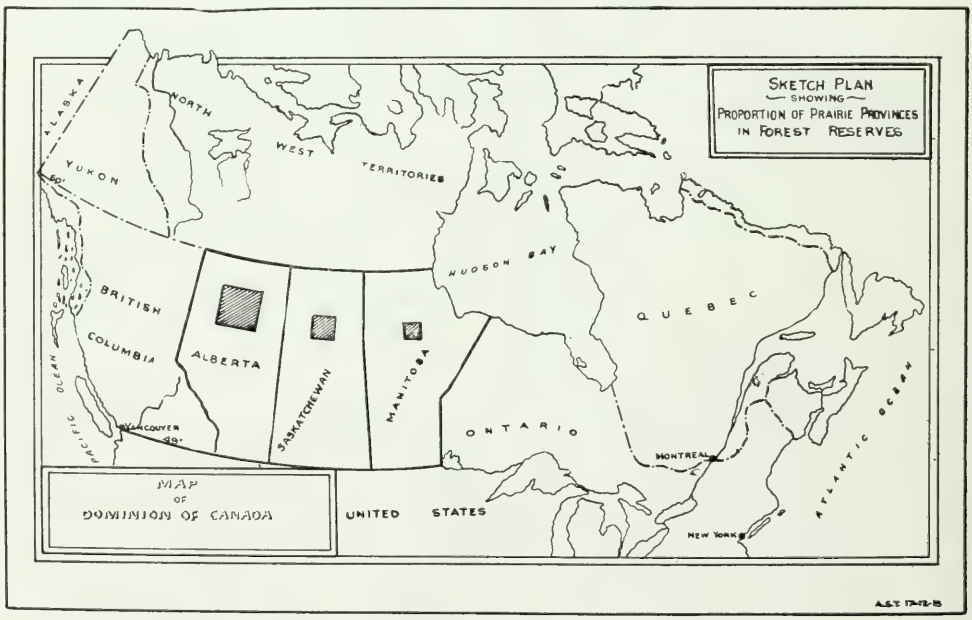
The rate at which wood is consumed in the manufacture of paper in Canada has steadily increased. In 1916 the quantity of pulpwood cut amounted to over 2,800,000 cords and to give you some idea what this quantity of wood represents, I might say that if it were all in four-foot lengths, and piled four feet high, the pile would reach a distance of 4,292 miles, or in other words from Vancouver to Halifax, and out into the ocean one-fifth of the way to Liverpool. The lumber sawn in Canadian saw-mills in one year, if placed in one pile, would make a cube a quarter of a mile to the side, or fill a freight train long enough to reach from Calgary to Fort William, and then half way back to Winnipeg. Or it would build enough five or six roomed houses to house comfortably one million people.

Why The Forest Reserves?

With no decrease in the demand for wood, and a constantly decreasing supply, it is reasonable to believe that means must be taken to conserve what we have and provide for a future supply. Fortunately the forest is not like the mine. Once the mineral is out of the mine the mine is useless. The forest, however, can be restored, even though cut clean, and in time under proper management it will yield as good, or probably better, crops than the one first removed. With this object in view the governments of the Dominion and some of the provinces have set aside many million acres as forest reserves. The name "forest reserve" is perhaps not wisely chosen for these areas, since it conveys th eidea to many that their purpose is to withhold the timber in them for use. The term "National Forests" as used by the United States for similar areas, would perhaps be more appropriate. The forest reserves are areas that cannot be profitably farmed. They are of such a nature that they would not yield a farmer a proper living. The farmer requires good soil and in such a position that it can be cultivated. Not so with the forester, he asks only for lands the farmer cannot use. In the older provinces there are many instances where areas of soil unfit for farming were opened up for settlement to earnest men and women anxious to make a home for themselves. After drudging away the best part of their lives they were compelled to give up or else they continued until all ambition had gone and their degenerate families became subjects for public support. Let us hope that the newer prairie provinces will not make the mistake of the older provinces.

To Aid West's Water Supply.

As pointed out above, the forest reserves have not for their purpose the locking up of the timber, or other resources within them. The first aim of the reserves is to supply for all time the largest quantity of the best timber which can be produced on it. This means that cutting must be regulated as to quantity, and young



Showing the proportion of the prairie provinces reserved for timber production; 14 p.c. for Alberta; 3.97 p.c. for Saskatchewan; 1.75 p.c. for Manitoba. France has reserved for forest production 18 p.c.; Germany, 25 p.c.; Sweden, 47 p.c.



An experiment in Northern Alberta in clearing lands by controlled fires. This was conducted last Spring by the Dominion Government, wide fire guards being first prepared.



The same area as above after the fire died down. It is claimed that the soil was undamaged and that the land can be made fit for farming at a saving of 80 p.c. in costs of clearing. The work was directed by Fred V. Seibert. Look for special article in the May issue.

trees must be encouraged to replace the old. Another important function of the reserves is to conserve water supply. Forests do this by retaining the rainfall and letting it flow off gradually. The ground within a forest acts as a sponge which permits the rain and melted snow to slowly find its way to the creeks and streams, instead of running off all at once, being wasted and causing floods.

It is the desire of the forest administration to develop all uses of the reserves to the full. Settlers are permitted, for a nominal fee, to take timber required for their own use and to graze their cattle on open areas also available for camping, fishing with the reserve. The reserves are and other recreation purposes.

Prohibiting altogether the cutting in a forest reserve would be very poor economy. Trees are not everlasting like humans they grow up, mature, and finally die. Better, therefore, to use them while they can best be put to use. By removing the mature trees we make room for the young vigorous trees to take their place.

How Reserves Are Planned.

The Dominion Forest Reserves covered, approximately, 43,750 square miles, an area twice that of the province of Nova Scotia, or over half that of Manitoba, prior to 1912. These reserves lie in the three prairie provinces and in the railway belt of British Columbia. The Dominion Government also maintains a free patrol service over many hundreds of square miles of forest not yet included in reservations. Before any areas are included in reserves they are covered by surveys by trained men, to ascertain the character of the country from a forester's point of view. A belt of country from the east to the west of the provinces of Manitoba, Saskatchewan and Alberta, comprising in all 145,000 square miles of the northern parts of these provinces has been surveyed. In some respects the survey has been a disappointment for a comparatively small proportion of the area is found to be covered with timber of any size. Much of it has in the past been badly damaged by fire.

At present, and for some time to come, the development of the fore t reserves has meant, and will mean, the expenditure of a large amount of money with only small returns. Roads and trails have to be built so that the products may be taken out and that all parts of the reserve may be accessible in case of fire. Houses must be built for the rangers and headphones must be provided to keep the supervisors in touch with their men. All this work requires years to carry out. However, it has been the experience of countries which have introduced scientific forestry that all expenditure is amply justified.

Indeed, in the present stage, the forests of Western Canada are far from being a "gold mine" to the Dominion Government. The Forestry Branch expends annually in Manitoba venue; in Saskatchewan it spends $145,000, and gets $9,000 revenue: in Alberta it spends $200,000, and gets $18,000 revenue.

A European Comparison.

The area of forest reserves in the prairie provinces may look large but compared with most European countries the area of the provinces occupied by reserve sis small. Belgium, perhaps the most thoroughly cutivated country in the world, has nearly one-fifth of its area in permanent forests. France has about the same proportion. Compare this with Saskatchewan's five per cent., Manitoba's 1.66 per cent., and Alberta's 10 per cent. Even British India, one of the most densely populated countries in the world, where forestry has been practiced for half a century, has about one-seventh of its area in forests.

The returns per acre from managed forests are much greater than from

natural forests. The longer an area is kept under forest management the better th ereturn. In Switzerland there are forests which have been under management for four centuries and they yield a net revenue of $6.20 per acre per year, or at the rate of $992 per quarter-section.

Fire Patrol Comes First.

The first step in getting the Dominion forest reserves in shape for actual administration under somewhat intensive forestry practice, was the institution of a system of patrol by rangers. The secret of success of such patrols lies not so much in the actual fighting of fires as in the prevention of fires and putting them out while still small. A large percentage of the fires are started by campers, not deliberately, but through carelessness. They leave camp fires without extinguishing them. The fires smoulder for a time, then break out and consume many acres of timber. It is the forest duty to remind campers to put out their fires and to post warning notices. The ranger also gets in touch with settlers and warns them of the danger of clearing by fire during the dry season. If the ranger discovers a fire on his beat he puts it out, or if this is an impossible task to perform alone he summons such help as is available. The telephone has been found a wonderful aid in summoning assistance, but this is not enough. Therefore we must have trails and roads in order to ensure quick travel from one part of the reserve to another. These roads also serve as an excellent place from which to fight a fire which is retarded whe n it strikes a strip of earth clear of growth. Lookout towers set on hill tops at various places throughout the forest are also a great aid. From their tops a view can be obtained over miles of territory, and the column of smoke which marks a fire can be located.

All these trails, roads, lookout towers and telephones are preliminary steps in forest management. The foresters aim is to get his forest in such shape that a crop of timber can be taken off year after year and still enough timber can be left to provide for similar crops year after year for all time. Young growth must be coming on all the time to replace the trees removed. To secure this repro-



A dense shelter belt on the Brooks' Demonstration Farm, Southern Saskatchewan.

duction, as the forester calls it, is one of his first cares. Cutting must be regulated and conducted in such a manner that young trees will not be injured unnecessarily. If young trees are not already present in sufficiently abundant numbers, older trees of the right kind must be left to seed up the area. In some cases it may not be advisable to depend upon this natural seeding. It may be best to gather seed elsewhere and sow these areas artificially. Or conditions may be such that it is advisable to grow the young trees from seed in a nursery and set them out while still very tiny.

Can We Do As Well?

The forests of Canada are far from the ideal state. They have been sadly neglected and abused, but perhaps not more so than, in former times, were the forests of many of the European countries. Indeed, a hundred years ago in some of the countries that today have attained the foremost place in European forestry, the forests were little, if any, better than ours are now. Canadians are becoming awakened to the need of caring for their forests, and they can apply to their forests the accumulated experience of the last century in Europe, as adapted to conditions on us, with these as well as with our other natural resources, is to get the very best possible use out of them whether the use be for the supply of timber, the protection of water supply, the providing of recreation or for the many minor uses for which the forests may be of service. For all of these the forests will continue to be of use. The forests are here to stay, and the sensible thing, the provident thing, the patriotic thing to do, is to take care of them and they will amply repay the care we bestow on them.

A GOOD WORD FROM WINNIPEG.

"We wish again to express our appreciation of the great work that is being done by your organization."

Western Retail Lumbermen's Assn.
F. H. Lamar, Sec.-Treas.

SEAPLANE FOR PRICE BROS

A large seaplane will shortly be shipped from Vancouver to Price Bros., of Quebec., where it is expected it will be used in connection with the timber operations of that company. The seaplane is being built by Hoffer Bros., and has a 42 ft. spread and a passenger capacity of two. It is considerably larger than the flying boat which was built by the same company for the B. C. government. The plane will have a Curtiss 100 H.P. engine.

RECORD PRICES FOR TIMBER.

Prices unheard of in the history of lumbering are being paid to the British Columbia Government for fir and cedar timber. A sale which probably holds the record for all time was made recently when timber rights on 225 acres of land at Ramsay Arm, situated on Tidewater, at a point 130 miles north of Vancouver, were sold for $36,000. In this case the figuring was done on a stumpage basis of $5.30 per thousand feet for cedar, and $4.10 for fir. The net return to the government will be $160 per acre. Added to the high prices the mills are getting the benefit of approximately fifteen per cent. exchange on shipments to the United States, where nearly half the British Columbia cut has lately found a market. The volume of business in timber can be guessed from the fact that the Government sales of standing timber are now approximately three-quarter million dollars weekly.

(Pacific Coast Lumberman.)

Canada's Job in Handling Forests



by Dr. C. D. Howe

Acting Dean, Faculty of Forestry, University of Toronto



A Keen and Accurate View of a Pressing National Problem

The land area of Canada is approximately 3.5 million square miles. Our first point to consider is what proportion of this enormous extent of country is covered with trees and what proportion of the tree covered area is today actually bearing saw logs or pulpwood. By referring to the map, we first notice the area in the far north designated as Barren Lands. This area includes at least one half million square miles, a region in which the climatic conditions are too inhospitable for trees, and often even for the more lowly plants.

South of the Barren Lands there is a very sparsely wooded transcontinental belt containing about 700,000 square miles. This is the "Little Stick region," with real trees only along the water courses. It will never materially contribute to our supply of saw logs or pulpwood, although the scattered local patches of forest will always be valuable to explorers, fur traders, and we hope some day to the mining interests which may develop there. This is the region also that we hope some day may be covered with flowing herds of reindeer. Let me say in passing that no one is more interested in the proposal to raise reindeer in this region than the forester. The fundamental conception of his profession is that every acre of land should be producing something of value, and only the crop to which it is best adapted. A forester does not wish any area to be covered with trees, if it will give a better financial return to its owner in some other crop. There is no antagonism between the forester and the farmer. The forester begins where the farmer leaves off. The slogan of the forester is: Make the loafing acre work.



The dark section roughly approximates the area of commercially-valuable timber in the Dominion.

As you know, the western part of the Dominion is mountainous. It is so mountainous that at least 200,000 square miles are above tree line—too cold and too high for trees. As you also know, the prairie-plains region of Canada covers about 200,000 square miles. We don't know just why this region is treeless. There are many opinions, but very little exact knowledge on the subject. Since, however, this great area is on the whole agricultural, or at least capable of becoming agricultural, the forester rejoices that it is treeless.

Our Barren Lands.

If we add these areas of treeless regions, as given above, we find that 1,000,000 square miles are incapable of producing commercial forests. **Over 40 per cent of the land area of Canada is either too cold, too high, or too dry to produce saw logs or even pulpwood.** This is a fact that is

overlooked by those who talk boastingly of inexhaustible forest supplies.

Subtracting the treeless areas from the total land area, we get 1,900,000 square miles of forested country. So you see we have an enormous area of tree covered land. Let us now examine these areas to find what they will yield in terms of saw log and pulpwood material. They may be covered with trees, but are they covered with commercially valuable trees? I shall answer that question by saying that from one half to two thirds of our forests have been destroyed by fire in the past 75 years. It takes twice that length of time in the average forest conditions to make a spruce saw log, that is a tree twelve inches in diameter. In other words forest fires have destroyed the saw logs on over 1,000,000 square miles of good Canadian territory. Ninety per cent. of those fires were caused by sheer carelessness. We are already beginning to feel the pinch of the diminishing supply of accessible timber. You will more readily comprehend what the destruction by past fires means when I say that the loss is equivalent to about 450 years' supply at our present rate of consumption of four billion board feet a year. Let me emphasize the point in another way. All the destroyed timber was on Crown land, land that belongs to the people and from which the people collect a tax when the timber is cut. The smallest tax collected by any government, Dominion or Provincial, is 50 cents per thousand board feet. It runs from that up to $2.50 per thousand feet. If we apply the lowest rate to the amount of timber destroyed by fire, we find that the public treasury has lost around one thousand million dollars in potential royalties alone.

I am bearing down hard on the significance of forest devastation by fire because, although I have spoken of it in the past tense, it is not in the past; it still continues; it not only continues, but in the past ten years the rate of destruction has probably increased. Every acre of accessible timber burned on Crown lands makes it harder for you and me to live. It means a loss of public revenue from a source nature gave us free of charge. This loss has to be replaced by taxation, either direct or indirect, and you and I eventually have to pay it.

Trained Fire Fighters.

It is not my purpose to discuss the forest fire problem at this time, but I wish to say this. Our forests now in charge of governmental bureaus will never be made reasonably safe from destruction until more time and thought, more money and energy are put into the development of the technique of fire figthing. Fighting fires in the bush requires specially trained men and special machinery, just as does the fighting of fires in the city of Toronto. Merely sending a large number of men into the woods each summer as patrolmen, will never be an entirely efficient method. Such men can fight only the one-man or two-man fire, and it is only a few minutes that a fire remains such. Means must be provided to get a crew of fire fighters quickly on the spot. This involves the making of roads, trails, the cleaning out of canoe routes and the building of telephone lines. Hard, expensive, non-spectacular work, but fundamental in any efficient system of forest fire fighting. Already the methods of detecting fires are developed far ahead of methods of fighting. The lookout tower on a mountain top fails to be efficient if there are no means of sending men to the fire which it has reported. The aeroplane may detect many fires in a few hours, but the knowledge of their existence is of little value unless there are means of quick transportation of men to the fire. The lookout towers, the aeroplanes, are of spectacular interest and excite the public fancy—but they do not extinguish forest fires. They are only auxiliaries in a fire-fighting system, and they can be efficient auxiliaries only when the groundwork is completed. It will cost money to develop transportation systems for



BURNED SEVERAL TIMES. PLANTING IS THE REMEDY.

The reproduction of trees which followed this first fire has been killed. No seed trees are left to make another crop Planting is the only method by which the commercial forest can be re-established on areas such as this.



THIS AREA HAD 2,000 YOUNG TREES AT ONE TIME.

Now it has only 20 living trees. The green forest, shown dimly in the background, is too far away to re-establish the forest on this area by seeding.

the fire fighters in the forest, and the consumer of forest products will pay the cost.

Our Man-Made Deserts.

At least one half, and probably very much more, of our commercial forest bearing area has been burned in the past three-quarters of a century, and consequently does not now contain timber of saw log size. This is a very deplorable fact. Nature, however, is a great restorer; in time she heals all wounds. So in time she might recover those 1,000,000 square miles of burned country with commercial trees. She often begins the process, but man interferes by allowing the young trees to be burned. Nature tries again, but man the second time kills the young trees she has sown, and so on repeatedly. Man has out-Pharaohed Pharaoh in his treatment of the forest. He has killed not only the first born, but the second, third, fourth and successive generations of young commercial trees. I know areas in the Ontario pnieries that have been burned thirteen times in the past fifty years. There are thousands of square miles of one time productive forest lands in Canada which are being gradually transformed into man-made deserts from the standpoint of commercial species through the agency of repeated fires. This state of affairs is little known or appreciated by the general public. They think so long as non-agricultural land is covered with trees all is well, when as a matter of fact the country is growing poorer all the time if commercially valuable trees are replaced by trees of inferior market value, as always happens in the case of repeated forest fires. The chief object of a forester is to cover non-agricultural lands—and to keep them covered—with the largest quantity of the highest priced trees possible. That is only another way of saying that a forester is a business man who is trying to get the largest and longest continued financial return possible fro mthe capital his employer has invested in the land.

Let us come back to the classification of forest lands. We have found that one half commercial forested area does not at this time contain saw logs because of destruction by forest fires. By saw logs I mean trees 12 inches or over in diameter. How much we can depend on the extensive burned areas for the future supply of commercial trees unfortunately we don't know at the present time. So far as area goes, one half our future supply should come from these burned-over lands. So far as our knowledge does go, however, the outlook is not very encouraging for such reports as we have indicate that about one-third to one-half the burned over lands are not reproducing the valuable species in potentially commercial quantities. A careful survey of conditions and study of the rate of growth on the old burns is imperatively demanded before we can make any reasonable prophecy as to the future supply of timber — in eastern Canada especially. Such work has already been initiated on a small scale by the Dominion Forestry Branch, the Commission of Conservation at Ottawa, and by your own Provincial Forest Branch. It is earnestly hoped that funds may be supplied for the immediate and continued extension of such investigations.

Subtracting the 1,000,000 square miles of burned forest lands from the total forested area, we find there are 900,000 square miles of unburned forest in Canada. More than half this great area, or about 500,000 square miles, does not contain much saw timber (trees larger than 12 inches in diameter), but probably enormous quantities of pulpwood. I refer to the Ungava-Hudson Bay drainage region. Large trees are found only along the stream courses and on the flats around lakes. On the upland areas the trees run from six to eight inches in diameter on the average, and they are full grown, in fact over 100 years old.

Continuing our deductions, we find that we possess only about 400,000

square miles of forest capable of producing saw logs, trees at least 12 inches in diameter, or territory equivalent to about one-eighth the total land area of Canada. As you know, this area occurs in two great blocks at the two extremes of the country, one in the east, the other in the west, and they are about the same size, namely 200,000 square miles each.

The West as a Future Supply.

In considering the present condition of these saw log bearing areas, let us begin in the West. The Commission of Conservation at Ottawa has recently completed a survey of British Columbia's forest resources. It was found among other things that the timber on two-thirds of the forested area has been destroyed by fire. The loss by fire in British Columbia alone is nearly equivalent to the estimated amount now standing in the entire Dominion. Yet in spite of this great destruction, British Columbia has today sufficient timber to last her nearly 300 years at her present rate of consumption. If it were accessible the supply of the whole Dominion at its present production could come from British Columbia for the next 70 years. In addition to this British Columbia is estimated to contain sufficient pulpwood material to furnish the present annual output of the Dominion for more than 50 years. The West may be our savior in timber supplies. Such supplies are a long distance away; the transportation charges will be high. It may be, however, that the public in the eastern provinces will pay such heavy charges in preference to being bothered with the care of their forests at home. If we should, in the future, draw heavily on western supplies, we should always remember that a small portion of the freight charge on each thousand feet of lumber from British Columbia reinvested to promote new growth in the forests at our doors would have rendered them continuously productive of saw logs for all time.

What of the Prairie Provinces?

Coming eastward, we find that the forest resources of Alberta have not been determined. We do know, however, that around three-fourths of the entire east slope of the Rocky Mountains has been burned within the past 50 years, thus so far as relative area is concerned the saw log producing forests are limited. The young growth, however, is reported to be coming on vigorously, and it is a valuable asset. In crossing the region north of the prairies in Saskatchewan and Manitoba, we would find less than one per cent. of the trees larger than eight inches in diameter—partly due to fires and partly due to climatic and soil conditions. We usually do not think of timber in connection with the prairie provinces, yet Saskatchewan cut nearly 90 million feet of boards, Manitoba over 50 million, and Alberta more than 33 million feet in 1917.

I trust I shall offend no one when I say that we have no very reliable estimates of the quantities of commercial timber in Ontario, although there have been many guesses. These guesses are based on the estimated forest area and the estimated yield per acre. They can be made in any office with the aid of a may and pencil. Ontario has about 10,000,000 acres under timber license and practically the same area in pulpwood concessions. The province also holds about seven million acres in forest reserves. A guess of the standing pine, Ontario's principal lumber product, made ten years ago, was equivalent to forty years' supply at the then rate of cutting. Statistics of production show that the output of white pine has decreased by more than one-third in the past twenty years. This means that the cut is [illegible] feet less than at that time. At $2.00 per thousand royalty, it also means a decrease in revenue from pine of $800,000 in the past twenty years. Taken at their apparent value, the statistics of provincial revenues, however, show no decrease. But if one examines the

figures, he will see that the apparent revenues are maintained not by the collection of royalties, but by selling stumpage, that is, by reducing the capital stock. Unless the forests of Ontario are growing faster than we believe they are, we are becoming poorer each year by such treatment. When we consider the enormous destruction by fire of standing timber and especially the young growth, the destruction by windfall and insect diseases, and the apparent deficiency of natural regeneration on unburned cut-over lands, it seems apparent to us that we are constantly reducing our forest capital, but I must confess that we have not as yet sufficient statistical data as the result of investigation and research to make such a statement as a scientific fact. The Commission of Conservation at Ottawa at the present time is making a survey of the forest resources of Ontario. This work will probably last about five years. At the end of that time we will know more about our own conditions than we do at present.

The Forest Service of the province of Quebec also is gradually acquiring data with regard to the forest resources of that province. The province of New Brunswick is making a very detailed survey of its resources. This will be completed within a few years. Now, the province of New Brunswick is also, in co-operation with the Commission of Conservation at Ottawa, making a systematic study of the rate of growth of the forests. When the province knows by actual measurements just how much timber it has and how fast it is growing it will be able to practise forestry; which means, in general, the taking from the forest each year only an amount equivalent to the annual growth and leaving the forest capital to continue that growth indefinitely, as it will do if protected from fire and from disease.

Our Capital Stock Declining.

I have already referred to the fact that the destruction of forest capital by repeated fires has been so great that it is probable that it, in combination with the amount of material taken away by logging, results in the depletion of the capital stock. For several years I have been engaged in the study of the amount of young material and its rate of growth on cut-over, unburned pulpwood lands in Ontario , Quebec and New Brunswick. The studies have been made in the mixed forest type, hardwoods associated with spruce and balsam. I find that as a rule in this type there are not nearly as many young spruce trees to make the future crop as has been taken away by logging operations. The usual condition is about one-third as many. I find also that these areas which have been cut-over several times in the past forty years are accumulating spruce wood at a much slower rate than it is being cut. On the average as much spruce has been cut in the past forty years as it has taken nature about 250 years to produce. In other words, the annual growth in the past forty years has been only about one-sixth as great as the harvest. These results apply only to a definite type in definite river valleys. We do not know whether they are representative of the conditions in the whole of eastern Canada. It is very important that we should know, and only until such studies have become much more extensive than they now are can we predict with reasonable accuracy the duration of our forest resources based on the present annual consumption.

What Lies Ahead?

Owing to recent discussions of the subject in the press, I suppose you would be much interested to know how long the supply of pulpwood in our eastern forests will last at the present rate, or at the expected increase in the rate, of consumption. Estimates have been made which extend all the way from 15 years to 1,000 years. About 30 years ago a prominent lumberman predicted that the timber supply of eastern Canada would not last twenty-five years — and we still have some timber left.

Yet his prediction came true. Using the standard of his time, he was right. In those days they were cutting trees two feet in diameter. It apparently did not occur to him that the use of smaller trees would become profitable. If we were today dependent upon trees two feet in diameter for our timber or pulpwood supplies we would be facing a famine. Except in protected places, softwood trees of that size are gone from the forests—and they will never return. There are very few areas of commercial timber lands in the St. Lawrence drainage basin and in the Maritime Provinces that have not been cut over at least once—most of them several times, and some of them five or six times in the past 60 years, and each time smaller trees and more inferior material were taken. Rising prices of lumber made this possible. The higher the price of lumber, the closer the utilization of the forest. Trees too small to be utilized today, may, and in all probability will, be used 10 or 20 years from now. Estimates as to the continuance of the spruce pulpwood supply are usually based on trees 12 inches or more in diameter, for this is the diameter limit below which spruce trees may not be legally cut in Quebec, where the pulp and paper industry is centered. Personally, I believe that the supply of spruce trees of that class will not last very much longer at the present rate of increase in pulpwood production in eastern Canada. In fact, the diminishing of the supply has already begun. When the shortage of spruce trees over 12 inches in diameter becomes acute, there will be at least three courses open to the pulp and paper companies. They may bring pressure to bear to get the 12 inch diameter limit removed so they can utilize the smaller spruce trees in the forest, or they may substitute other woods for spruce. The latter process has already begun since increasingly larger quantities of balsam are used each year. Owing to its susceptibility to disease, however, it is probable that balsam cannot be depended upon to a great extent for future supply. Woods not now extensively used may be pressed into service, such as poplar and birch. Enormous quantities of these species, as yet practically untoched, are to be found in eastern Canada. The making of pulp from poplar requires a different process from that of birch, and each in turn a different process from that of spruce. So if the hardwoods were used instead of spruce, the pulp mills would have to be reorganized, new machinery installed and new processes established. This would be expensive, but it would be done if necessary—and the consumer of pulp products would pay the cost.

Hudson Bay Prospects.

The other alternative before the pulp companies when the supply of 12 inch spruce gives out, would be to move northward into the Hudson Bay region and utilize the small, undersized spruce to be found in the north country, where thousands of square miles are covered with spruce from four to eight inches in diameter. It has attained full growth; it will never be any larger and might as well be cut. As you know, the northward migration of pulp and paper mills has already begun. I believe it will continue. I believe the next generation will see the center of the spruce pulpwood industry on Hudson Bay waters instead of on St. Lawrence waters. The manufacturing costs will be high, the transportation charges will be heavy—and the consumer will foot the bills.

Costs Must Keep Rising.

The lumber industry in Ontario and Quebec began on the shores of the Great Lakes and the St. Lawrence River, and it has been pushed northward ever since. The fact that we have to go farther and farther away from the markets for the supply of our material has been reflected year by year in the increasing prices of lumber. The present high prices of lumber are a response to supply and demand. The chances are that unless we undergo some great indus-

trial crisis, the prices of lumber will never be very much lower, at least, until we attain the adjustments of a stabilized industrial development and is several generations ahead of us. The demand increases, the supply decreases, the prices go up. What else can you expect? It will cost you more to build your houses in the future. The furniture you put into your houses will cost you more than at present. Your newspapers will cost you more. Everything into which wood products enter will increase in price largely because you have neglected to protect and conserve your great natural forest resources lying on non-agricultural lands, almost at your doors. I say the high prices of lumber are here to stay, and I will also say that they will go still higher unless the public that owns the forests initiate at once recuperative measures. The sooner the great industrial consumers of wood fibre realize this the better. If the newspaper publishers know where their bread is buttered, they will use their columns much more extensively and effectively than they have in the past in the endeavor to convince the public that we cannot wantonly deplete our forest resources without paying the price, and consequently urge methods of handling our forests that will keep them in continuously productive condition.

What High Prices Entail.

Personally, although I am a householder, I welcome the coming of high prices of forest products, for on the whole they will work out advantageously to the forest and to the community. The higher the price of lumber, the greater will be the value of our forests, and consequently the greater will be their protection. We protect the things we value. We have destroyed our forests in the past because we held them cheap. We were not sufficiently interested to insist on their protection. We will get the more interested, however, the more we feel the financial pinch of diminishing supplies. The greater their value, the more intensive will be their cultivation. We cultivate the crops that pay best.

Re-invest the Forest Revenues

I trust you will not consider me tinged with red when I assert my belief that the community should share in the increased price of lumber. In British Columbia, for example, when the market value of lumber goes above a certain price agreed upon as furnishing the producer a reasonable profit on his investment, the royalties exacted by the province increase in definite ratio. Thus the people as a whole, profit by the upward trend of prices. I would suggest that a certain portion of such graduated tax be re-invested in the forest by the community to accelerate the regeneration and growth of the commercial species and thus keep our woodlands at our market doors, continuously productive. Most private business is sustained by a re-investment of a certain portion of its profits. The communities' forest business can be sustained only in the same manner. The Dominion Government spends about $3,000,000 a year for the encouragement of agriculture, which is another way of saying that amount is re-invested in the business of increasing the productivity of the farm soil. The forest soil products have a value equal to that of our wheat crop, yet we are reinvesting almost nothing to continue its productivity. The lumber industry created for Canada in 1917 forest products valued at $116,000,000. The pulp mills of the country produced in the same year materials to the value of $96,000,000, a total of over $200,000,000. The lumber and pulpwood industries stand third as producers of wealth in this country, being surpassed only by agriculture and manufacturing. We re-invest a portion of the earnings of agriculture and of manufacturing to keep these industries going, but with the exception of spasmodic planting we have reinvested very little of the forest revenues to encourage the regeneration of the present commercial species. We must do this. We must re-invest a certain

portion of our timber and pulpwood revenues in the promotion of new growth if we would keep our readily accessible forests continuously productive, if we would maintain the continued prosperity of our third largest industry—and that is only another way of saying if we would maintain the continued prosperity of our country.

(An address delivered before the Royal Canadian Institute, Toronto, March, 1920.)

The Date Palms of Mesopotamia

by C. B. Gill, Forest Assistant, Dauphin, Man.
(late with the British Forces in the Far East)



Outside the citadel gate at Baghdad.

When twenty-seven days out from Devonport the first glimpse of the green strip of date plantations along the Shatt-el-Arab is a refreshing sight. We had lounged for twelve burning days on the ironclad deck of our tramp steamer since we left the coolness of the Mediterranean, and adventured into the Red Sea and the Persian Gulf. From our vantage point on deck we saw over the tops of the date palms and realized that only a mile back, or in some cases, only a few hundred yards stretched a vast, flat, whitey-gray desert, shimmering to the vague horizon.

Date growing is one of the few industries which Turkish misrule has allowed the Arab to make a success of. 80,000 tons of dates were exported yearly before the war. The plantations extend in a narrow belt along the river from the Gulf to Kurna (the Garden of Eden of the British Tommy). From Kurna to Amara marsh lands intervene, but at Amara some fine plantations occur. Beyond Amara only a few small groves mark the site of the riverside towns until Baghdad is reached, and there perhaps a dozen miles of date plantations interspersed with orange groves, skirt the banks of the Tigris. On the Euphrates small plantations occur at Ramadie, Hit and Anah, but beyond the last place (the only beautiful



The famous Shatt-el-Arab, Mesopotamia.

town in Mesopotamia), the fig, the the almond, the plum and the apricot of more temperate regions take the place of the date.

Water Raising Devices.

The zone of maximum development for the date centres at Basrah and Mohammerah. The reason for this lies primarily in the higher temperatures which occur here, and secondarily in the greater ease of irrigation, due to the lowness of the river banks. As the Arab proverb says, the date must have "its feet in water and its head in fire." The trees are spaced about twelve feet by twelve feet, and between every second row runs a ditch, which terminates at the river. As the tide rises the fresh water of the river is forced ahead of it into the irrigation canals and minor ditches, but when it subsides the fresh water can be kept in the ditches by closing the water-gates at their lower ends. On the higher reaches of the river water has to be raised into the ditches by donkey-power, operating various contrivances of wooden pulleys and sheepskin buckets. On the rock-bound Euphrates beyond Hit, great water wheels perhaps thirty feet in diameter, are turned by the current and raise the water in numerous earthen pitchers fastened to their outer margin.

16 Cents Tax Per Tree.

The otherwise ignorant river Arab is a technically trained man when it comes to date culture. Some sixty varieties are known, differing very slightly from one another, mostly in the fruit. The Arab does not trust to nature for a crop; hand fertilization must be practised. Male trees are about one to every eight female. In March, when the flowers appear in the centre of the new crop of fronds, the male flowers at a certain stage are broken off and tied with a whisp of grass in a reverse position over the female flowers. Here they are left until the male flowers have shrivelled up and pollination has taken place.

During the hot summer the date clusters turn from green to yellow, and in September to a deep brown. Then is the harvest season. The Arab girds his skirts around his loins and

ascends the tree with his basket on his back, leaning back against his belt like a lineman climbing a telephone pole. As much as a hundred pounds of fruit is obtained from a single tree, and as it takes a tree about ten years from planting before it produces a full crop, from when it bears for perhaps a hundred years, it can be readily seen that a tree once producing is very valuable. Each tree pays the British Government a tax of eight annas (sixteen cents), while any tree destroyed in camp construction is paid for.

How Date Trees Are Used.

The date furnishes the concentrated food of the desert traveller in much the same degree as bacon and flour supply our woodland wanderers. All the ancient caravan trails are strewn with the date stones of the past. But the date tree supplies stimulant as well as food. The "arack" of the East is distilled from fermented date juice, and although the Prophet forbade the use of wine, it would seem from the gait of some of his followers during the feast of the Ramazan that the rule was not strictly enforced. The triangular base of the frond is used for fire-wood, while the mid-rib is split into strips which make an excellent framework for a bed. The fibre around the base of the frond is spun into rope. The bole of the tree itself, although not what we would call timber, was largely used by the army in the absence of other trees, in the building of bridges and wharfs.

SAFETY IN THE AIR.

Since the war, Mr. Handley Page, recently visiting in Canada, has been developing the commercial side of aviation, and is planning enterprises in three or four continents. Regular services have been established between London and Paris, and London and Brussels. Mr. Page could boast with pardonable pride that on these routes his machines had flown 65,000 miles and carried 4,200 passengers and 49,000 pounds of freight up to March 1 without a single mishap. He thinks Canada is a favorable field for commercial aviation, because of its great distances and its comparative freedom from fog and the other varieties of weather which hamper flying in Great Britain. He suggests that the aeroplane would be invaluable for forest patrol and railway surveys in new districts. On the superiority of private enterprise over State control in a business in which technical advances are so rapid, Mr. Page is emphatic.

"Canadian youth in the air service won a heritage of glory for the Dominion," observes the Toronto Globe. "The number of Canadian air pilots in the war, 11,000 or one for every 800 of the population, is a record unequalled. Mr. Page handsomely acknowledges the vital part played by this country in winning for the Empire supremacy in the air, and his own obligation to Canadian aviators. If commercial aviation has a future in the Dominion, as Mr. Page thinks it has, it will have a great body of special skill to draw upon.

THE CAUSE

(Douglas Malloch, the Lumberman Poet.)

There's something wrong about our times:
Some money madness fills our veins;
Now each upon his brother climbs—
The more he climbs, the more complains.
The worker wins a higher wage,
To pay some other wage as high;
There's something wrong about our age,
And we who labor wonder why.

What profit any profit if
We do but feed upon ourselves?
Yet we who toil must also live,
For our own need we fill our shelves.
The more we ask the more we pay,
The more we pay the more we ask—
Like squirrels in a cage at play,
The greater speed the greater task.

I am no doctor learned in laws
Of social or of psychic man
But yonder there must be a cause
Where this insanity began.
I think we reap the punishment
Of human toils when we fought
Success was riches, gold content,
And joy was something to be bought.

HOW LONG WILL TREE SEED KEEP ITS GERMINATING POWER?

Answered for the Forestry Journal by B. R. Morton

Dominion Forestry Branch, Ottawa

With reference to your enquiry regarding the germination of tree seed. I might say that the seed of different species have a wide range in keeping and germination qualities. A number of coniferous and broad-leaved species that mature in the autumn do not under natural conditions, germinate the following spring, but lie dormant in the ground and germinate one or two years later. Some of the pines and junipers germinate very slowly. The western white pine may lie in the ground for several months before more than a small percentage begins to show. Red cedar requires a year or longer. Honey and yellow locust also lie for a long time. White spruce seed during a dry season will lie over until the second year. Larch is also irregular and may lie over a year. In general, species in which the seed is protected by a thin absorbent covering usually germinate within a few weeks after sowing. Those with thick, hard or leathery covering, such as the nuts, are slower and more irreguar. Seed of such species as the white elm red maple, silver maple, poplars and willow, remain alive but a few weeks after ripening. They mature their seed in the late spring and early summer and should be sown at once. Other species like the chestnut, hickory walnut, oak, beech and ash, lose much of their germinating power if dry stored. They should be planted in the fall, or if it is necessary to hold them over until the spring, they should be layered between moist sand. As a rule the drier a seed becomes in storage the longer will germination be delayed after sowing. Nuts dry stored over winter will often live over until the second year when planted. The seed of most coniferous species may be safely dry stored in a cool place.

REVIVAL OF TOPIARY.

(London Times.)

Topiary, or the art of tree-sculpture, has experienced a great revival during the last thirty years, and many gardens nowadays boast their spirals, pyramids, birds, and so on, grown and cut in yew and box. An expert whose nurseries at Richmond contain some 3,000 picked specimens, states that the trees are very slow growing, and that the best specimens are produced by the patient Dutch, whose soil and climate are very suitable. Trees grown in Holland are quite hardy in this country, and require clipping but once a year. Birds, without base, take about ten or twelve years to grow, and dogs from twelve to twenty years, while other subjects requiring anything from ten to ninety years, include peacocks, serpents and serpentine columns, tables, armchairs, sitting hens, geese and ducks, dogs (with and without kennels), ships, horses and pigs. One man in the north has his crest, a pelican feeding her young, grown in yew.

The subject must be correctly formed, very thick and bushy, and free from decayed wood and leaves. For this reason the trees are only grown from one stem, so that all parts shall be equally nourished.

MUST PAY FOR TREES.

In a judgment rendered by the First Division of the Court of Review, the Bell Telephone Company of Canada was condemned to pay the Country Club of Montreal $592.01 damages in compensation for the cutting of a number of trees on their property situated at St. Lambert. This judgment reversed one of the Superior Court, and the Bell Telephone Company was also condemned to pay the costs in two courts.

Moving Mountains by Co-operation

THE Canadian Forestry Association has several new educational enterprises ready to put into action. These are in addition to the ones regularly employed.

Our Children's Lecturer, a special worker for juvenile audiences, has scores of invitations from school boards, boy scouts and Y. M. C. A.'s. Here is an Open Door. Here is offered to us the one rapid method of winning tens of thousands of young Canadians for the cause of forest conservation—a truly national cause.



The Canadian Forestry Association has a Tree Planting Car ready to visit Southern Saskatchewan and Alberta, where the planting of shelter belts means the economic salvation of much of the country. Do you favor this?



Canadian Forestry Association lecturers have given excellent service in some of the most remote sections of forested country. Education is the modern method of blocking forest conflagrations.



NO MAN'S LAND IN CANADA.

This is the thing the Forestry Association helps to prevent.

OUR Tree Planting Campaign for the southern prairie provinces, is all equipped and ready to start. We have been given a large railway car as a motion picture and demonstration hall. We have an experienced tree planter and lecturer selected. Co-operation is assured.



The distribution of forest protection literature is a potent method of reaching young and old in the districts where fires actually get their start.

But the money that will keep these campaigns moving comes only from the Forestry Association membership fees.

Whether we fulfill our comprehensive 1920 programme depends absolutely upon the volume of fees re-



Scores of public meetings are held by the Canadian Forestry Association in all parts of the Dominion. Motion pictures are freely utilized.

ceived at this office before June 1st. Is your fee held up — until "tomorrow"—until a "handier" time?

The Forestry Association belongs to its members. All the 'Dividends' of our work go to the Canadian people.

THIS also is worth remembering: The Forestry Journal costs us a dollar bill for paper and printing alone for your twelve issues.

When a member pays his Journal subscription and an extra dollar for his membership fee, he not only pays his own printing bill, but he puts one dollar into a vital educational task.

June the first is the date we have set to get all the fees into the fold. Today — This Day — is even more timely.



Not forgetting the faithful Forestry Exhibition Car which for three seasons has done sterling service in drawing public attention to forest protection.

Forest Fires and Canada's Fur Trade

Revillon Freres Trading Company, writing to the Canadian Forestry Association, state: "It is generally accepted as a fact in the north country that many fur bearing animals are destroyed in forest fires and it is certain that the Indians in their hunting operations neglect those parts of the country which have been burned over unless the brule is old."

Alberta's forest fires in 1919 meant $2,000,000 in destroyed wood alone.

Saskatchewan lost $8,000,000 of forest values in last year's fires.

Ontario annually suffers severe forest damage.

200,000 acres in Quebec were burned over in 1919.

What meaning has this for the fur trade of Canada?

"Canada is not only a great fur-consuming country, but is also one of the leading fur-producing countries of the world, and, provided we take proper measures to conserve our wild life, is likely always to remain so," observes the Commission of Conservation. "Although here, as elsewhere furs are often worn for ornament, our rigorous winter makes furs almost a necessity for many persons. The farmer who drives many miles to the elevator over the wind-swept prairies appreciates the value of a warm coon-skin, and knows that no covering devised by the ingenuity of man is so effective in excluding the cold as the natural protection with which the wild animals are endowed.

"Before the war, we were import-

ing more furs than we exported. For the fiscal year 1913, our total imports of this commodity amounted to $7,993,651, and our exports to $5,415,119 thus leaving an unfavorable balance of over 2½ million dollars. During the war we have had a favorable balance, small at first, but rising to $9,214,584 for the fiscal year 1919. For that year our exports amounted to $13,737,621 and our imports to $4,523,037. The increased value of our exports is largely due to the enormous rise in prices, but also indicates a considerable increase in the number of pelts exported. It is gratifying to note that in spite of the higher prices, our imports have actually decreased in value. This would seem to indicate that there is an increasing domestic consumption of our own furs.

In 1913, our imports from the United States were $4,228,456, and our exports to it, $2,343,183, showing a trade balance in favour of the States of $1,885,273. For the fiscal year ended March 31, 1919, the figures, as given in the annual report of the Department of Trade and Commerce, are: imports, $3,801,605; exports, $9,743,464; balance in Canada's favor, $5,941,859.

Our imports from Great Britain have declined from $1,294,462 in 1913 to only $148,456 in 1919. Meanwhile our exports have increased from $2,795,791 in 1913, to $3,763,955 in 1919. Taking into consideration the rise in prices, these figures indicate an actual decrease in quantity.

Undresed furs form much the largest item in our exports, over 98 per cent. of the whole, and also about 78 per cent. of the imports.

TIME FOR ACTION HAS COME.

(St. John, N.B., Telegraph.)

The Toronto Globe is of opinion that Canada can supply her own needs from her forests, and also have a large export trade, without destroying the source of supply. This could only be done by a nation-wide policy of conservation. It is safe to assert that the log cut and pulpwood cut in New Brunswick this year exceeds the forest growth for the year. That is to say, there has been an encroachment upon the permanent wealth in trees, which, if continued from year to year, would eventuatly wipe out the forests altogether.



Scenes on the Quesnel River, British Columbia.

The Forest Fire Melody—Who Pays the Piper?

Morden, Manitoba.

In travelling through the length and breadth of Canada, the thing that grips one most, is the appalling destruction on all sides, by forest fires. Travel in whatever province you will, it is the same story; thousands of square miles of virgin forest burned over year after year. So used has the average Canadian become to these conditions that he has looked upon them as a kind of necessary evil. But there is a day of reckoning coming, and coming quicker than most people think. No country was ever blest with a finer forest, naturally, than Canada, but we have squandered it with a recklessness that is nothing short of criminal. And the end is already in sight. We have been using our own share as well as the share of future unborn generations, and now, when the big demand for lumber and all building material is on, there is already a big shortage wit hprices soaring and no relief in sight. Meanwhile, we allow the forest fires to run merrily on, year after year, burning up millions of acres of mature timber and millions of acres of young growth as well. Strange that any nation in its right mind would allow this thing to continue year after year, especially when the lumber and pulp industry is the second in importance in Canada.

We have millions of acres of non-agricultural land in Canada that should be growing a crop of young timber right now, to tak ethe place of the mature stand when it is gone. In a great many instances nature would reseed these lands if the fires only were kept out, but every fire makes this problem of reseeding more difficult on account of seed trees being killed over wide areas.

I have in mind a tract of land in eastern Manitoba, non-agricultural covered with a heavy growth of spruce, tamarac, poplar and jack pine. I have cut logs in this forest over two feet in diameter. This tract of timber was entirely killed by fire in 1897, and has been burned off several times since. Today there is not a seed tree left, and the site is to all intents and purposes a desert. This can be duplicated in every province in the Dominion today.

I think what is needed most in Canada today is a campaign of education to show the people the utter folly of allowing this thing to go on. The average Canadian has never given this matter any thought. It is a case of never missing the water till the well runs dry. All power to the Forestry Journal, as it is through independent mediums like this that we must depend to educate the people to needed legislation. It is very seldom indeed, we find a Government in advance of the people.

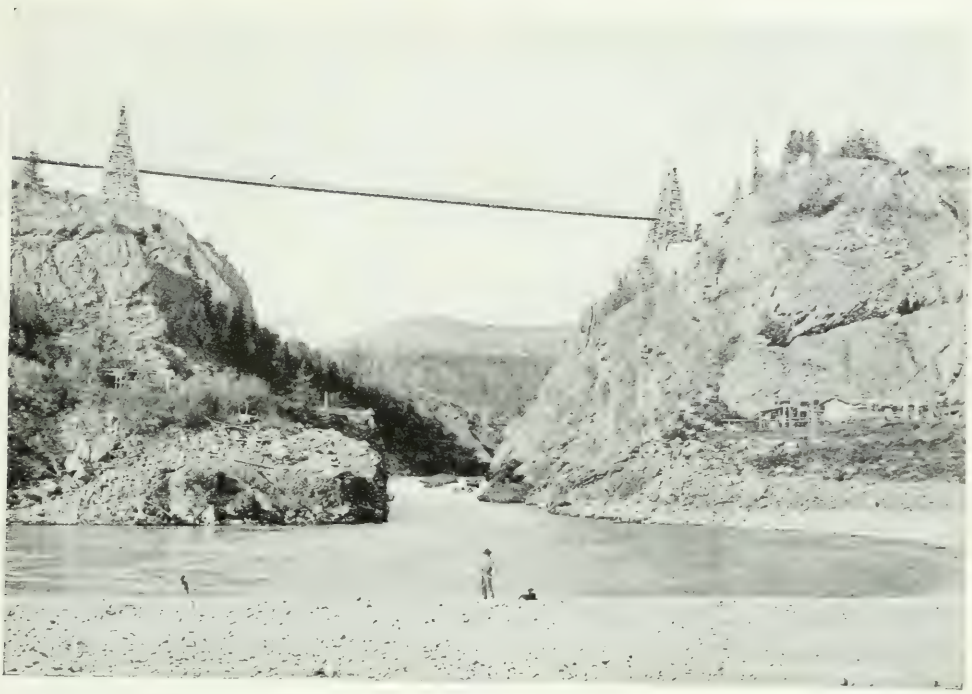
—M. J. STEVENSON.

SKINS AND TIMBER NET $168.

London, Ont. — William Elson, a farmer residing near Wingham, felled a huge soft elm tree, and in the top of it was the winter home of a family of raccoons with three lusty youngsters. Mr. Elson cut the tree into three logs and had them sawed into lumber. They yielded 2,804 feet, for which he received $98.14 at $33 per thousand. Then the farmer sold the skins of the coons for $70, making the total amount he realized from the tree and its occupants $168.14. Mr. Elson feels he has established a record for high finance in furs and lumber.

Please send in your membership fee promptly.

The members are responding splendidly to our new plan of a Two-dollar Annual Fee, including subscription to the Forestry Journal.



Along the Bulkley River, near Hazleton, British Columbia..



On the Skeena River, British Columbia, head of Kitsalas Canon.



A New Reference Map for Aerial Purposes

(by Stuart Graham, R.A.F.)

The fact that many lakes, rivers and towns frequently bear the same name has long been a source of confusion in various parts of Canada, and as the rate of transit increases, this becomes more troublesome. Now that aviation promises to be one of the most important assets in the development of the country, it is necessary to utilize some method whereby rapid and accurate reference may be made to any desired position or point. The carrying out of aerial work over the St. Maurice Valley during 1919 necessitated the adoption of such an idea, but this was more of a local nature.

For aerial photographic surveys, and the reporting of forest fires, it is absolutely essential that a generally accepted map covering a large area be utilised ,and yet this map must

permit of rapidly designating an exceedingly small area.

Various methods of rapid reference by 'map squaring' were used by all the belligerent countries during the war, but the areas dealt with were seldom as extensive as those which confront us in Canada. An index system covering the whole universe was drawn up by an International Conference some years ago, and although this will probably be used by all countries for long distance aerial transportation work, it is entirely unsuitable for "intensive" aviation such as is being inaugurated in the Province of Quebec, chiefly by the pulp and paper industry.

How the System Works Out.

The system illustrated concerns mainly the Province of Quebec. The area contained between the parallels 45°N and 52°N, and the meridians 60°W and 80°W, has been taken as that embodying all the territory in the province of interest to aviation. Beginning at the south-west corner of this territory, areas contained between degrees of latitude and longitude are numbered from west to east, and in consecutive rows northwards, notation being from 1 to 140 for the complete territory. The degrees of longitude are then divided into two equal parts, measuring along the parallels; and the degrees of latitude are divided into three equal parts measuring along the meridians. This divides each of the spaces enclosed by a degree of latitude and longitude into six parts which are designated by the letters A, B, C, D, E, and F, in each degree. Each of these lettered divisions is sub-divided into twenty-five parts, which are measured from 1 to 25. By referring to the illustration it will be seen that the position of Ottawa would be given as 5 C 19. This refers to an area about five miles square, which is accurate enough for most purposes.

Finer Sub-divisions.

An even finer division, not shown in the illustration, has frequently to be used on large scale maps where accuracy of location is necessary, as



How the province of Quebec would look to the flying man, equipped with the reference map.

in aerial photography. This has been done by dividing the smaller squares illustrated, again into twenty-five squares designated by the letters a to z (omitting the 'i'). This division provides an area slightly less than a mile square, which in connection with aerial survey is a very practicable size.

In the gnomonic map illustrated, the slight decrease in the east and west dimension of the divisions, owing to the convergence of the meridians, is given for each degree. One degree of longitude at 45°N being 49 miles (statute) and at 52°N being 42.7 miles. The dimension north and south is, of course, constant.

Similar methods can readily be adopted for other parts of Canada and areas between meridians 60°W and 80°W would be referred to with the prefix Eastern, between 80°W and 100°W as Middle, between 100°W and 120°W as Western, and between 120°W nd 140°W as Pacific.

MUNICIPAL SHADE TREE AND SHRUB NURSERIES.

Russell, Man.

To the Canadian Forestry Journal.

The following suggestion is intended to apply mainly to the three Prairie provinces but might be adopted elsewhere with advantage.

The suggestion is to establish in each municipality a small shade tree and ornamental shrub nursery, where the people could come and get what shade trees and shrubs they required. Of one hundred people in the West, one or two ardent tree lovers might invest in nursery stock from distant nurseries. The others wont but the "Ninety and Nine," if they can get what they want within a reasonable distance, and where there need be no delay between the nursery and the planting, will take advantage of it to the full, and that with the chance of far greater success than the nursery stock, after the vicissitudes of the journey with its inherent delays, almost certainly a week, and very probably longer, between the nursery and the planting.

As to the nursery itself: A small plot of good land, clean and well cultivated. Water must be available. A six-foot board fence to act as fence and windbreak until the nursery grew its own hedge and windbreak, but all advantage should be taken of any shelter available.

An expert's advice would be of great benefit at the beginning and perhaps the Experimental Farms, the Provincial Government or the seedsman might be able and willing to help. The cost need not be great. The land, labor, fencing, a small shed for tools, etc., perhaps a well and a few pounds of tree and shrub seeds, a garden seed drill and the requisite tools.

Such is my "suggestion."

The writer is no horticulturist and the idea may be crudely put, but the basic idea is there, and that is to put within easy reach of the people what I think they need and very much desire, but are never likely to get unless some such scheme is adopted.

"Utility and Beauty."

TO NEW SUBSCRIBERS !

Subscription price for twelve issues, $1.00.

Membership in the Canadian Forestry Association, $1.00.

Practically all readers of the Forestry Journal are members of the Association and pay the inclusive fee of $2.00. You are urged not only to subscribe to the Journal, but to accept membership in the Association.

FROM A NOVA SCOTIA MEMBER

"By educating the public through the Canadian Forestry Journal I think you are doing a wonderful work towards the preservation and reforestation of our woodlands throughout the Dominion."

Why British Columbia Needs a Forest School

by Captain H. R. Christie, M. C. Victoria, B.C.

Education has proved the best national investment. It is the stabilizer of society. The countries and the peoples which have best stood the terrific strains of war and peace are those which foster education. It is the searchlight of industry. The nations foremost in the world today are those which study science and apply it.

An educational policy from an economic standpoint should be based primarily on the conservation—or in other words, the wise utilization—of natural resources. These, in British Columbia, are chiefly forests, minerals, agricultural land and fisheries. The University of British Columbia has well-established faculties in agriculture and mining. There is every reason also for the provision of a faculty of forestry.

Put the Scientist at Work Here!

The forests are probably the most valuable natural resources in British Columbia. They form the largest single source of Crown revenue. British Columbia has been likened to a great timber farm. The simile is good. The bulk of the land area is forested and is more suitable for growing timber than any other crop. Over a large part of the province conditions for timber growth are more favorable than elsewhere in Canada Great quantities of timber have been destroyed by fire, as in other provinces, but there still remains a stand estimated at three hundred and fifty billion board feet of saw timber which is half the total stand of saw timber credited to Canada. In addition, there are over sixty million acres of young forest growing up. A crop like that deserves some study.

The province has a dominating interest in this great wealth. Timber licenses and leases sold in the past yield revenue in the form of ground rent and royalty. Timber sale licenses of the present yield an additional revenue, called stumpage. Timber licenses carry title to the timber, but not to the land. That remains the property of the Crown. The great bulk of forest land in B.C. is owned by the Crown. Even on most Crown-granted land royalty is payable on timber cut and sold. Assets carry obligations. Provision for forest education is an obvious responsibility of the biggest timber owner in Canada —the province of British Columbia.

Train Canadians at Home!

Forest administration in British Columbia, as elsewhere in Canada, is handicapped by shortage of foresters. British Columbia, lacking a forest school, has been, and still is, dependent on outside universities. These were drained by the war, and will have few graduates in forestry during the next two or three years. There is a great deal of investigative work requiring attention. Examples are: Studies of growth and yield, reproduction, regeneration, slash disposal, reconnaissance, etc., etc. Men with a university training are needed for this work. The logical source for them would be the under-graduates and graduates of the Faculty of Forestry, University of British Columbia.

The approaching exhaustion of the virgin timber stands of eastern and southern North America is already reflected by the accelerated demand on the Pacific northwest. Vast as are the western forests, they are no more inexhaustible than were those of the east. The time to practice conservation is before—not after. A diagnosis for the living is better than a post mortem for the dead. The time for a forest school in British Columbia is now.

Active Work at Quebec Tree Nursery

(by G. C. Piche, Chief Forester of Quebec, in 1919 Report)

During the current year we shipped 941,500 plants, representing a total value of $3,800. As in the past, the lumber companies, the Laurentide and others, continued to encourage us. Moreover, we sold many ornamental trees to individuals and distributed, free of charge, to various educational institutions a certain number of young trees in order to diffuse a knowledge of forestry.

We continued planting ornamental trees and we now have over 35,000 plants.

Owing to the successive additions to the nursery, we had to completely stop agricultural work through lack of space. If we are called upon, as we foresee we shall be, to produce between five and ten millions of plants per annum, we shall have to buy other lots of lands to enlarge our nursery, because we have no other additional space.

We shall have to put up a seed-house, and organize ourselves for gathering the seeds of the various forest trees of the country. Hitherto, we have been obliged to get our seeds from abroad, but it is now time to think of obtaining our supplies here, for this will enable us to reduce our expenses and to have more vigorous trees from acclimated stocks.

WIRELESS IN FORESTS.

Wireless telegraphy as a means of reporting forest fires may soon be generally used in British Columbia. Efforts are now being put forward by the Forest Branch of the Department of Lands at Victoria, with a view to ascertaining the feasibility of the plan, and while definite action may not be taken in the matter for a few months, the question is receiving serious consideration.

Chief Forester M. A. Grainger strongly advocates the establishment of a wireless telegraph system in the principal forest districts of the province, and he is now seeking information on the probable cost of the project. He feels that the plan would lead to a substantial reduction in the cost of fire fighting and protection, and that it would be of important service to the lumber industry as a whole.

The scheme has been considered from time to time by the department, but indications are that it has now reached that stage of development where something of a definite nature will be done. Mr. Grainger, in conversation with a representative of the Pacific Coast Lumberman, expressed the hope that this year would witness the development of the project into something tangible. He is pretty well convinced that the step would be worth taking, and it is now merely a question of departmental policy to be decided by the government itself.

AN AERIAL MAPPER.

Readers of the Forestry Journal will be interested in an advertisement appearing in "The Aeroplane in Canada," by Price Bros., Quebec, calling for an aerial photographer to map timber limits. This is probably the first "want ad." of its kind ever published.

Aerial Photographer. — This Company seeks the services of a man with successful experience in the work of developing and printing aerial photographs and who is capable of making up maps from these photographs. Returned flying officers with experience and knowledge of this work are eligible for this position. During summer of 1920, this Company plans to photograph its timber limits from the air in order to obtain accurate aerial maps. It is essential that applicants shall have done this work at the Front. Applications may be directed to the offices of this Company, **Price Bros. & Co., Limited, Quebec.**



Ingenika River Falls, tributary to Finlay River, British Columbia.



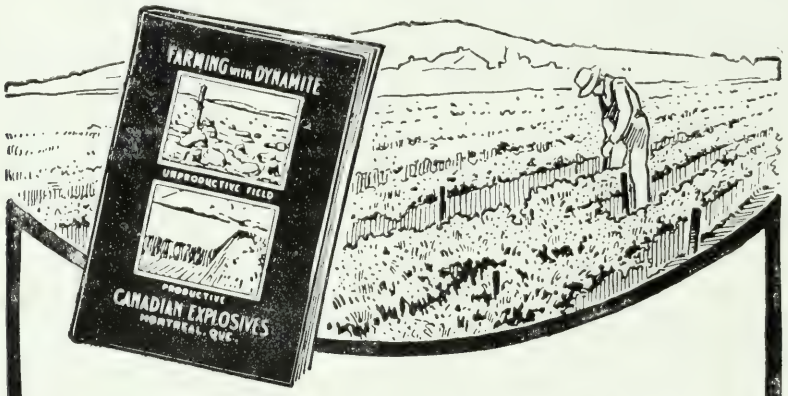
Finlay River Falls, British Columbia.

Quebec Plans for Systematic Cutting

(G. C. Piche, Chief Forester of Quebec in his Annual Report)

We have to note a marked progress in the organization of operations. In the month of April last, the Department made an inquiry for the purpose of ascertaining, as soon as possible, the places where the license-holders intended to work this winter and in order to be able to determine, within a short delay, the sections where the trees could be cut at a smaller diameter than that fixed by the regulations owing to forest conditions. This enabled us, during the summer, to inspect a great many places and to report on the advisability of modifying the regulations or of insisting upon their being strictly followed.

We consider this a considerable progress and a step in the direction of systematic organization and the making of a programme for cutting laid out, not for six months or a year in advance, but rather for several years; in a word, we shall soon have working plans and shortly afterwards plans for successive cuttings. This



This Free Book Will Help You Make More Money

It shows you how farming—whether on new land or old—can be made doubly profitable, how acreage can be increased, labor saved and crops made larger.

"Farming With Dynamite" is a book that you should have. Get your copy today and learn how C. X. L. Stumping Powder will help clear that stump lot, remove the boulders, dig your ditches, either for drainage or irrigation, and blow holes to plant fruit trees that grow faster and bear earlier and heavier than spade-planted trees.

From the standpoint of crop cost you cannot afford to be without C.X.L. Stumping Powder. This free book tells you all about its use and how it helps increase your profits.

Write for your copy today.

Canadian Explosives Limited

Transportation Building, Montreal.

There is money in Agricultural Blasting. Write for proposition. 15

CANADIAN EXPLOSIVES TRADE C X L MARK LIMITED

Mention the Forestry Journal for your identification.

year, we intend to begin inspecting as early as the month of January, if possible, so that the license-holders may know the decisions of the Department in the early spring and what they will have to do. The advantage of doing this work in winter is that it enables our men to compare the places where work is to be done with those which are being cut and those already cut over in the neighborhood. The cost of this inventory, combined with those of the supervision of the cutting, is consequently lower than if the work was done during the summer when travelling in our woods is less easy than in winter.

Supervision on Private Lands.

As in the past we have devoted much time to the inspection of lots granted to settlers for the purpose both of ascertaining the progress made in clearing and of preventing illegal cutting, which, as very frequently happens, is done by unscrupulous holders of location tickets.

To succeed in having a sufficiently effective control, it will be necessary to inspect the lots at least three times a year, as is done in Abitibi. Such vigilance has a wonderful effect.

THE OLDEST NOVEL.

(London Sphere.)

The oldest work of fiction extant is thought to be "The Tale of Two Brothers," written 3,200 years ago by the Theban scribe, Enana, librarian of the palace of King Menepthah, the supposed Pharoah of the Exodus. The tale, it appears, was written for the entertainment of the Crown Prince, who subsequently reigned at Set II. His name appears in two places in the manuscript, probably the only surviving autograph signature of an Egyptian king. This piece of antique fiction, written on nineteen sheets of papyrus in a bold hieratic hand, was purchased in Italy by Mme. d'Orbiney, who sold it in 1857 to the authorities of the British Museum, where it is now known as the d'Orbiney papyrus.

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Journal for your identification.

A WOODEN MAGNET DRAWS THEM.

The following remarks by President Dodge, of the International Paper Company, New York, will interest our readers. Canadians, of course, will not necessarily deplore the sound laws that compel U. S paper mills to cross the border and do their manufacturing here.

"The United States printers are largely at the mercy of foreign producers and there is no encouragement for the United States manufacturers to invest another dollar. Not being able to obtain wood from our holdings in Canada, the International company is now erecting its first paper mill in Canada, being forced to do so in order to obtain a return from its timber investment. This will probably be followed by other mills In brief, the American manufacturers are being forced to take American capital out of the country and invest it abroad in order to protect themselves.

"Wood suitable for papermaking is rapidly disappearing. A number of United States mills will have to cease operations within a few years. The International company, producing practically 2,000 tons of paper a day, is being compelled to convert certain of its mills for the production of other papers. It will endeavor however, to hold its production of 1,200 tons, more or less, of newsprint a day, and if possible to increase this production in time."

TREE DESTRUCTION CONDEMNED.

"That this meeting place itself on record as being in favor of legislation compelling the Hydro-Electric Power Company, Bell Telephone Company, Niagara Power Company, and other similar corporations, when about to string wire or erect transmission wires, lines which are likely to injure or interfere with growing trees, to obtain the permission of the Ontario Department of Forestry and the council of the municipality through which such lines may pass and the owner of such trees, before commencing such works."

Passed at a meeting of Ontario horticulturists at Guelph, Ont.

GOVERNMENT BUYS A SAWMILL.

(Australian Forestry Journal.)

Statements were made during the last session of the Victorian Parliament that building, chiefly in Melbourne, was being seriously hampered owing to the operations of the brick and timber combines. The Victorian Premier (Mr. Lawson) has announced that the Ministry has authorized the Forests Commission to purchase from the Nayook Sawmilling Company, Upper Latrobe River, near Powelltown, its sawmill plant, together with all buildings, mill and logging, tramways and other equipment, and the leasehold rights over a valuable milling forest of 2,100 acres.

Forestall Colds, Chills and Influenza

TAKE

BOVRIL

Use Bovril in your cooking. It flavors, enriches, nourishes more.

The Body-building Power of Bovril has been proved by independent scientific experiments to be from 10 to 20 times the amount of Bovril taken.

PAPER & BOX BOARD MACHINERY

(FOURDRINIER AND CYLINDER TYPES)

PULP DRYING MACHINES
MILLSPAUGH SUCTION COUCH
MILLSPAUGH SHOWER PIPES
PRESS AND FELT ROLLS
GRANITE PRESS ROLLS
BRASS COVERED ROLLS

Davies Oscillating Suction Boxes, Barking Drums, Pulp Digestors

P.A.P.A. SCREEN (Spangengberg System) FOR PULP & PAPER

Dominion Engineering & Machinery Company Limited

MONTREAL, Que.

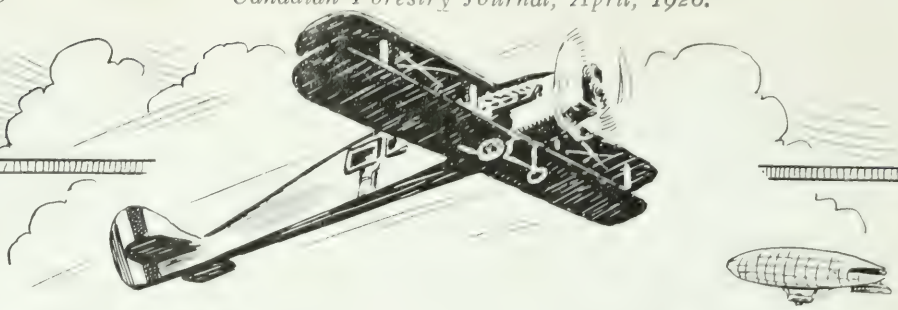
Works—LACHINE, QUE. Phone—WESTMOUNT G800

Dominion Bridge Co.

MONTREAL.

Manufacturers of

PULP AND PAPER MILL MACHINERY



WE ARE PREPARED TO UNDERTAKE AERIAL PATROLS AND SURVEYS AT RATES VERY MUCH LOWER THAN HITHERTO DEEMED POSSIBLE.

Our Aerial Photo Topography work determines elevations and contours accurately. Our photographs determine different varieties and numbers of trees.

Our experience is unequalled. The Air Express Services of the Aircraft Transport & Travel Company between London, Paris and Italy, and between London and Holland have operated with greater punctuality than the trains connecting with the Channel steamers. Our allied enterprises cover the world. We are the only firm in existence that has successfully carried out commercial air services and aerial surveys.

Our association with

THE GREATEST AIRCRAFT ENTERPRISE IN THE WORLD

and the superiority of our technical equipment and staff GUARANTEES SUCCESS.

Address all communications to the Canadian Office.

AIRCRAFT TRANSPORT AND TRAVEL, Limited

LONDON OFFICE: 25 & 27 Old Queen St., London, S.W. 1, England.

MONTREAL OFFICE:
301 Montreal Trust Building, Montreal, Canada.



Mention the Forestry Journal for your identification.

New Brunswick Trebles Its Forest Income

The forest revenues of New Brunswick have more than doubled during the past year. It is estimated that the total will amount to about $1,500,000. This is nearly three times the forest revenue for 1917, and closely approximates the forest revenue of Quebec. It falls only a few hundred thousand dollars short of the forest revenue of Ontario. This is on a cut of some 343 million feet of logs, ties, poles and pulpwood, supplemented by some minor sources of revenue.

The province of New Brunswick has achieved this highly satisfactory result by a thorough reorganization of its forest service. This is now administered by an Advisory Board consisting of three representatives of the Provincial government, and two representatives of the timber owners. Patronage has been eliminated and efficiency and economy have been furthered by making the one organization responsible for the various lines of forest work, including fire protection, enforcement of cutting regulations and timber scaling. The staff employed consists of full-time men, who work for the Government only. Hence the scaling has been much closer, and this fact, together with a higher royalty and perhaps a slightly increased total cut, has brought about the immense increase in revenue and thoroughly vindicated the Government's progressive forest policy.

—C. L.

BRITISH GOVERNMENT DROPS ITS TIMBER.

(Manchester Guardian.)

The Government have now disposed of their entire stock of foreign softwoods, both at home and abroad. The purchasers are the members of the importers' section of the Timber Trade Federation, and the price is stated to be about £10,000,000.

MILL SUPPLY DEPARTMENT

BEVERIDGE PAPER COMPANY, LIMITED

Agents from Coast to Coast

Everything in Paper

Plastic and Liquid Roofings — Concrete Hardeners

Wood Preservative and Stains

PLIBRICO JOINTLESS FIREBRICK

Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!

IF YOU WANT EXTRA QUALITY

MILL BROOMS

SEND YOUR ORDERS TO

THE PARKER BROOM COMPANY - OTTAWA

Mention the Forestry Journal for your identification.

WOODLOT IMPROVEMENT.

In answer to an inquiry from the Canadian Forestry Journal, Lt.-Col. J. W. Harkom, Melbourne, Quebec, an industrious improver of his own woodlands, sent the following remarks:

With intelligent care, farmers' woodlots would give returns that now seem, to the average farmer, unlikely; but wider knowledge is necessary to give such men interest to stimulate their action.

For one thing, the allowing of cattle to run at large in the lot must be prevented. It takes but little time to see how much damage is done by the practice.

Then careful cutting and trimming would furnish much more fuel wood than at first sight would appear, and the result in the growth of timber and general appearance of it would give an added value to the property.

Planting, and encouragement of naturally-sown young trees would, in a few years, give still more value.

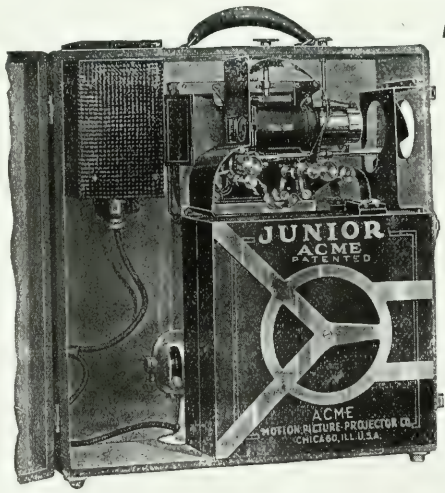
These latter three points cover what I consider the chief work a small woodlot requires to change it from the present general valueless appearance to an asset.

It will be perhaps only by some State action that a wide improvement coud be effected, and that by taking over some areas and demonstrating what can be done and its value.

An estimate as to values in cash is not practicable except by survey of the actual sites.

There are several reasons why the woodlots are constantly running down: Thoughtless cutting; grazing; carelessness about forest fires, and lack of thinning.

The remedies are simple and easily applied. What then is the trouble? I think there are two reasons for this, both of which lie in the attitude of mind of the farmer. First of all, he is not accustomed to think of his farm



The Junior Acme

The Motion Picture Machine Everyone Can Afford to Own.

Takes standard 1,000 foot reels.

Motor Driven. Can be operated from the ordinary electric light.

It has every feature necessary to project a perfect rock-steady clear-cut picture.

Fitted with metal magazines, patented framing and focusing devices. Frames and focuses picture instantly.

Weight, 22 lbs.; Size, 17 inches long, 18 inches high, 7¾ inches wide.

PRICE $150.00.

This price applies only when machine is required for religious and educational work.

Write for descriptive circular.

SUPPLIES COMPANY OF CANADA LIMITED

65 SPARKS STREET. OTTAWA, ONT.

Be sure to identify the advertisement with Canadian Forestry Journal.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country

Very Easy Bleaching Sulphite

Spruce, Pine and Hemlock Lumber

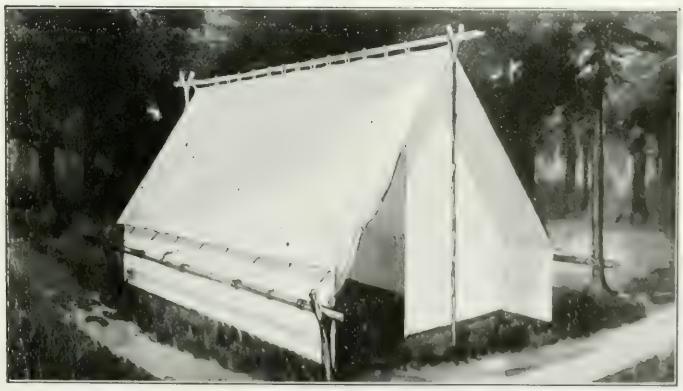
Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Mention the Forestry Journal for your identification.

YOU CAN RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes, Rogging R.R's.
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL — Old Town, Maine.

Mention the Forestry Journal for your identification.

ATTENTION! Fire Equipment, Limited, is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West - - - - MONTREAL

woodlot in the same way as he does of his live stock or of his formland. He continually thinks of these as invested capital which should return a regular profit. He thinks of his woodot, not as profit-earning capital, but as something more or less beyond his control. Second, the farmer is not well informed as to the possibilities of the profitable practice of forestry on his woodot. He fails to realize the opportunity open to him of learning how to make his woodlot pay.

Year by year our woodlands are getting into worse condition. Year by year the prices of our wood products are increasing as the supply decreases. The war has taught us something of what we have to do in order to make economic and efficient use of what we have. Is it not the duty of every thoughtful man, on or off the farm, to make the most of what he has, be it personal ability, education or invested capital in the form of woodlots?

CAPITAL IN LUMBERING.

According to a preliminary report on th elumber industry of Canada issued by the Dominion Bureau of Statistics, the total capital invested at the end of 1918 was $180,017,178, of which logging and timber plants totalled $36,516,701, mill equipment $53,791,373. The total number of operating plants was 3,086. The number of persons employed on salaries was 3,550, and the total salaries paid were $4,911,735.

The average number of persons working for wages totalled 56,816, of whom 26,735 were employed in operations in the woods, and 30,080 in the mills. The total amount paid in wages was $44,490,917.

By provinces the value of the lumber cut was as follows: Alberta, $473,694; British Columbia, $27,992,-976; Manitoba, $1,240,052; New Brunswick, $12,189,312; Nova Scotia, $4,089,039; Ontario, $33,165,137; Prince Edward Island, $136,336; Quebec, $20,916,6604; Saskatchewan, $2,-122,307; Yukon, $10,315.

BOOK REVIEW.

Forests and Trees. B. J. Hales, B.A., LL.B., Principal Normal School Brandon, Man., Macmillan Co., Toronto, 1919. 205 pages, 72 illustrations.

In the preface of this book, recently off the press, the author has stated its purpose is to assist in impressing upon the young the value of our Canadian forests. The book doubtless will have great value in schools; however, it is by no means a child's book, since it can be read with interest and advantage by older people who desire to learn something of one of Canada's most important natural resources. The author deals largely with conditions in our three prairie provinces but the remainder of Canada has not been neglected. He has succeeded in presenting in a way that makes interesting reading, much information that makes the book valuable to

dwellers in all parts of Canada.

The subject matter has been treated in two sections. Part I deals with the forests, their economic and aesthetic values, devastation and preservation, and includes several chapters on tree growing which can be read with profit by those desiring to grow trees under prairie conditions. Part II is comprised of short notes on many of the tree species native to the prairie provinces and British Columbia, including a brief description of a few exotic trees.

The book is well illustrated with 72 photographs, diagrams and drawings.

"SATURDAY NIGHT'S" VIEW.

"Four hundred miles of telephone lines are to be laid through the forests of the upper Ottawa district as part of the scheme of the Ottawa River Forest Protective Association for the prevention of forest fires. The decision to proceed with the construction of 200 miles of these lines at once was reached at the annual meeting of that organization, which concluded here recently.

"Arthur H. Graham, Chief Fire Inspector, in the course of his report, stated that last session was one of the worst for forest fires in many years. He said that 20,000 acres, or 31 square miles, of valuable forest was burned by unextinguished lunch fires, careless smoking by campers, travellers and berry-pickers, slash burning without fire rangers' permit."

Four hundred miles of telephone wire to send messages telling us what fools we are.

Thirty-one miles of timber making a bonfire in one year to show what fools we are.

Everything we do seems to be — put out fires—why not prevent them?

The forests of Ontario should have a close season on two things from now to eternity. Cigarettes and strike anywhere matches. The danger from pipes and safety matches is infinitesimal, comparatively speaking. Then punish everyone who leaves a camper's fire burning, whether damage ensues or not. It is not laws we want. We want enforcement of such laws; certainty of punishment even though it be mild is a great deterrent. Drastic statutes with lax enforcement breed contempt for all law, and are worse than no laws at all.

"Canoes that have made Maps and History."

EXPLORERS, TRADERS AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS

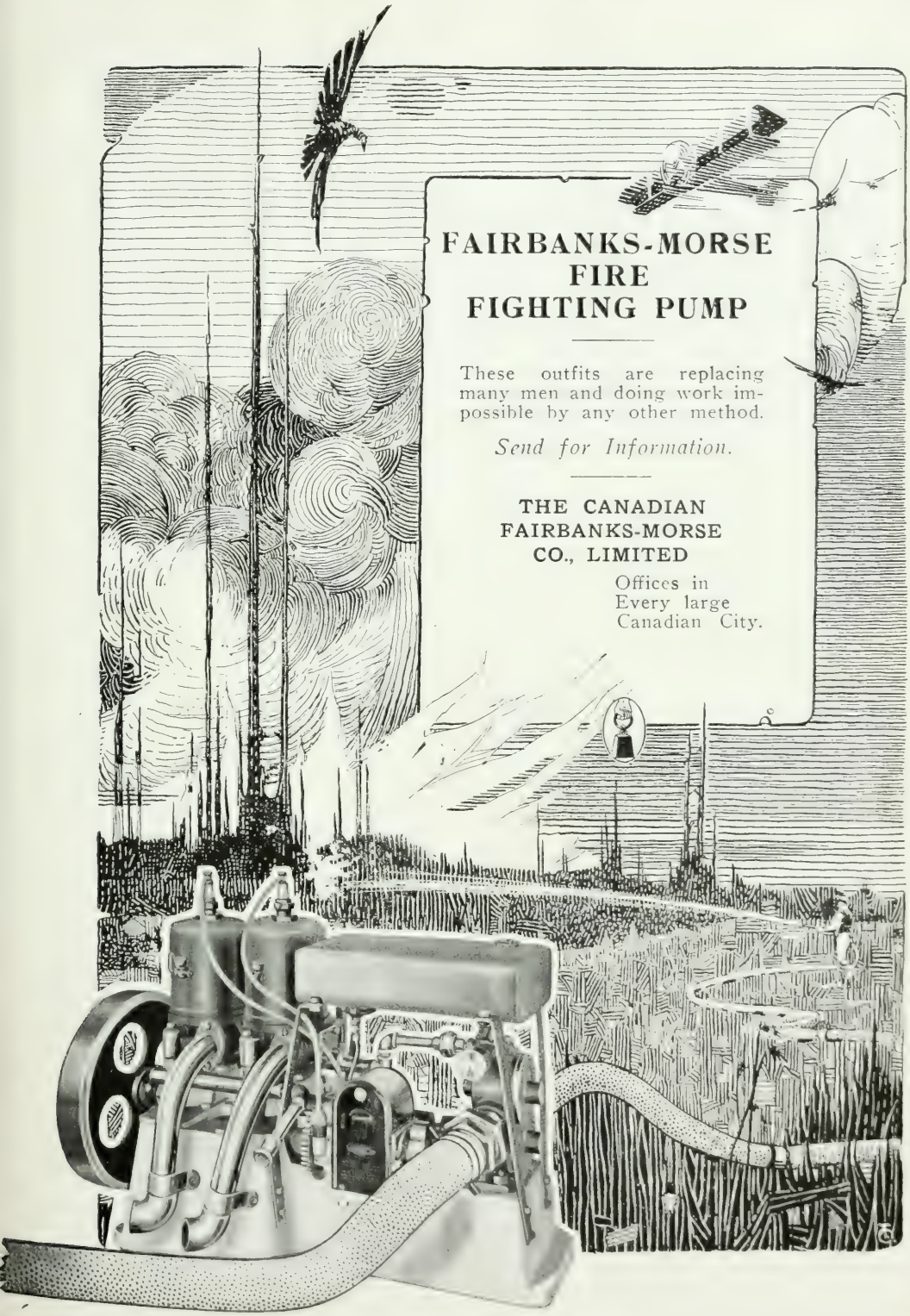
When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE & BOAT CO., LTD.

LAKEFIELD · ONTARIO CANADA

Mention the Forestry Journal for your identification.



Mention the Forestry Journal for your identification.

LATENT POSSIBILITIES OF THE FARM WOODLOT.

By E. C. M. R., in Rural New Yorker.

As a timber estimator who is called upon to travel about the rural districts of the country, I have noticed one thing of special interest in the farming communities, and that is the almost universally run-down condition of the farm woodlots. And this condition of the farm woodlots is growing worse and worse year by year as the constant misuse or neglect of the woodlots goes on. As forestry is one of the most important branches of agriculture, I feel that attention should be called to this serious situation.

The present system of harmful treatment of farm woodlots is shown by the fact that it is growing harder and harder to get any good telegraph poles, saw timber or even railroad ties locally in our rural districts. In many localities any small patch of good timber is today a noteworthy the stranger, even where every farm has a comparatively large proportion of land covered with tree growth. On making inquiries a man like myself generally finds that everyone recognizes that the woodlots in the neighborhood are running down year by year.

D. E. HUTCHINS KNIGHTED.

Sir David Hutchins, knighted in recognition of his services to forestry in the Empire, has worthily earned that honor. The record of his official and other activities as a forester is one upon which he has every right to look back with pride. After serving for ten years in India, and for 33 in South Africa, he organized the Forest Service of British East Africa, and controlled it to the time of his retirement as Chief Conservator. In 1909 he was retained by the British Government to report on the forests of Cyprus. He is the author of many authoritative works on forestry, and the eminence he has attained in his professio nis indicated in the fact that

LUMBERMEN ATTENTION!



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,

BATHURST NEW BRUNSWICK

WANTED

150 lbs. White Spruce Seed

(Picea Canadensis)

LINCOLN WOOD PULP CO.

Box 923 BANGOR, MAINE

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST

DRYDEN, ONT.

Shippers to H.M. Government.

Mention the Forestry Journal for your identification.

only three other foresters had previously received the honor of knighthood. It is not the least noteworthy feature of a distinguished career that at an age when most men would have been content to seek leisured retirement, Sir David Hutchins devoted himself to the somewhat thankless task of urging the claims of forest conservation in countries where as yet its importance and the benefits it offers are little understood. It is very largely due to his efforts and skilled advice that systematic forest development is now in progress in all the Australian States except Tasmania. In a comprehensive report on New Zealand forests he has paved the way for similar progress in this country. It is due to the unfailing enthusiasm of Sir David Hutchins in the work to which his life has been devoted that measures are at last being taken to salvage the wreckage of our once magnificent forest estate.

"The Dominion," Australia.

To the many Canadians acquainted with the distinguished services of Sir David Hutchins, the above tribute will be heartily applauded.—Editor.

REFORESTATION IN N.Y.

Watertown, N.Y. — The National Paper Products Company, of Carthage, which operates a big tissue mill and factory for making up the product of the mill into paper towels and other sanitary articles, has decided to reforest its timber tract near Streeter Lake in the Star Lake region of the Adirondacks and will start the work this spring.

Last fall under the direction of the director of the State Ranger School at Wanakena of the State College of Forestry, the class of ranger students

Try This Stump Puller at Our Risk The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sta.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA



The JOST COMPANY, LTD.
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

Hills Seedlings and Transplants
ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.
THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.



QUEEN'S UNIVERSITY
KINGSTON, ONTARIO
ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.

Mention the Forestry Journal for your identification.

spent ten days on the tract, making surveys and topographical maps and outlining a plan of action for the reforestation project.

The tract consists of 1,700 acres and has practically all been lumbered over for pulp wood by the National Paper Products Company and its predecessor, the Carthage Tissue Paper Company. It is now proposed to plant about seventy-five acres this year and each year a certain amount until the tract is completely reforested. Several pulp and papepr companies in this region are now reforesting their Adirondack tracts and it is likely that many others will follow suit in future years.

REFORESTATION A PUBLIC JOB.

Federal and provincial governments should contribute appropriations for reforestation purposes in Canada, said Mr. A. E. Clark, of Toronto, in an address to the Electric Club, for " the very high cost of reproducing forests is the reason why lumbermen and timber interests should not be blamed for lack of activity along reforestation lines. No lumber concern is justified in making reforestation investments which will not fruitify for at least one hundred years, although pulp wood and similar grades can be reproduced in from thirty to forty years. Governments have so far seen fit to shirk this obligation."

There should be no comparison, he said, between reforestation methods of European countries and Canada. The soils were different and the methods adopted in Europe are entirely inapplicable here.

CEDAR

We are in the market at all times for clear EASTERN Cedar. We also buy clear cedar lath, special sizes.

If you are cutting any cedar write to us for particulars.

PETERBOROUGH CANOE Co. LTD
PETERBOROUGH CANADA

THE UNIVERSITY OF TORONTO

AND

UNIVERSITY COLLEGE

WITH WHICH ARE AFFILIATED

ST. MICHAEL'S, TRINITY and VICTORIA COLLEGES

Faculties of

ARTS MUSIC MEDICINE
EDUCATION APPLIED SCIENCE FORESTRY

Departments of

HOUSEHOLD SCIENCE SOCIAL SERVICE

For information apply to the Registrar of the University, or to the Secretaries of the respective Faculties.

Mention the Forestry Journal for your identification.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"

Mention the Forestry Journal for your identification.

RSC
INVESTMENT - SERVICE

Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities

Corporation
Limited

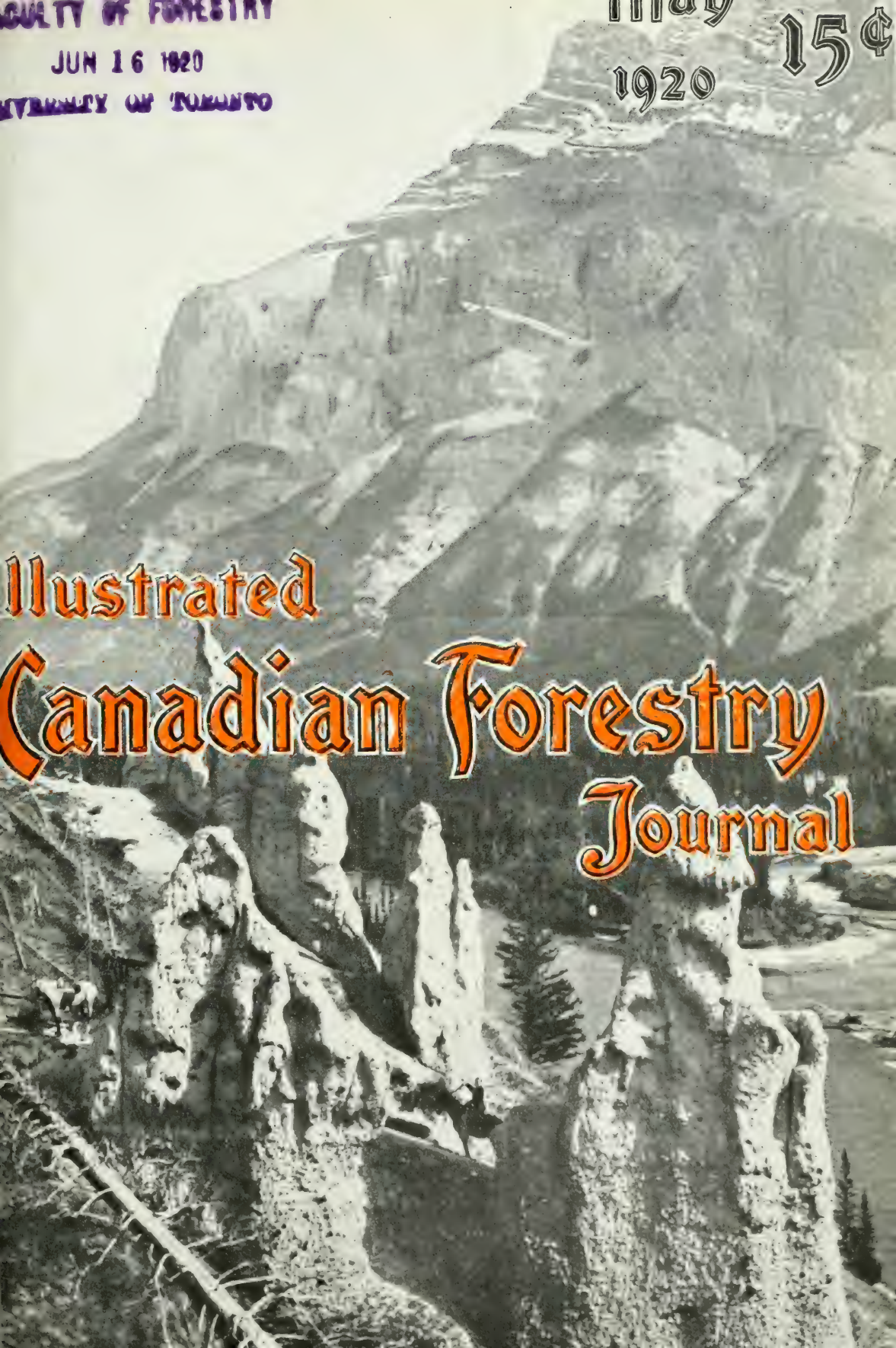
MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG.

Mention the Forestry Journal for your identification.

FACULTY OF FORESTRY
JUN 16 1920
UNIVERSITY OF TORONTO

May
1920
15¢



Illustrated Canadian Forestry Journal

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

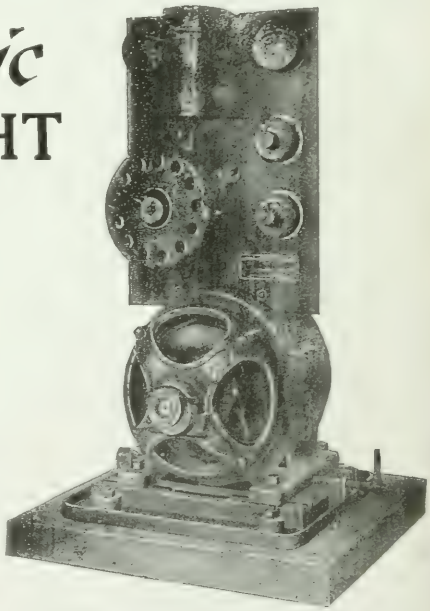
OTTAWA
CANADA
Dept. D.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

Mention the Forestry Journal for your identification.

IRCULATION: 11,500 COPIES MONTHLY ROESON BLACK, EDITOR

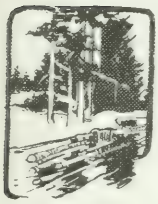
Canadian Forestry Journal

VOL. XVI. OTTAWA, CANADA, MAY, 1920. No. 5

Canada's Woods for Aircraft Making

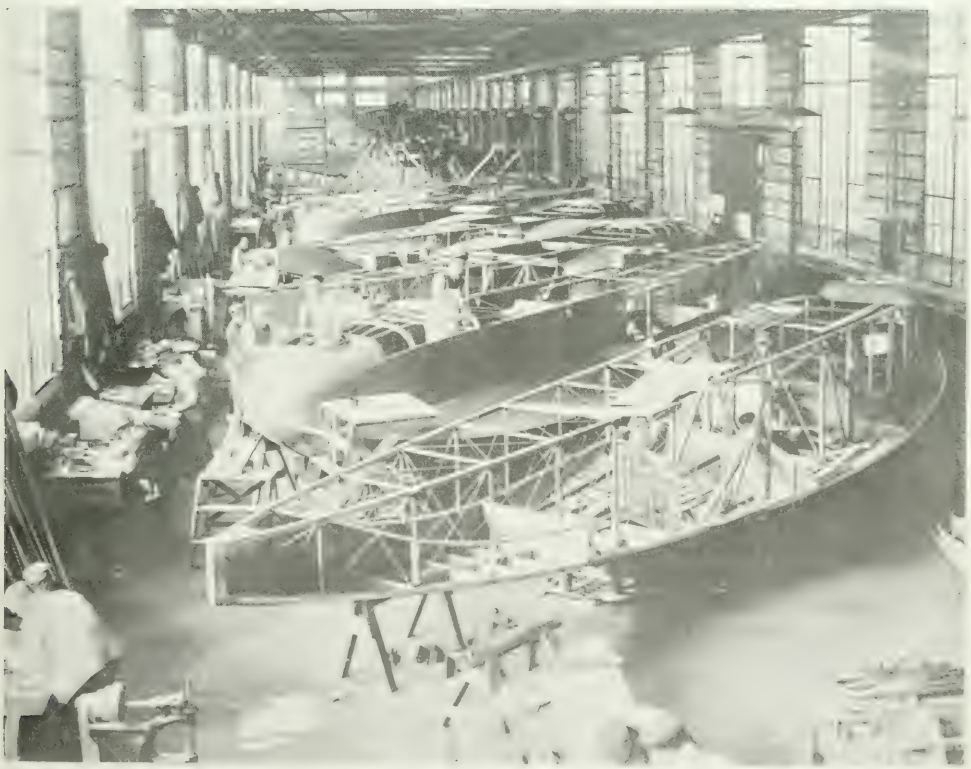
by Ronald D. Craig

Formerly Chief Inspector, Aeronautical Division, Imperial Munitions Board



An Expert Discussion of what the Dominion Can Offer Aeroplane Building of the Future





Wood, and more wood.—What the inside of an aeroplane plant looks like

Wood has probably never been used in any form of construction where it has been subjected to so severe a test as in the framework of an aeroplane. Usually it is possible to allow a sufficient margin over the



Inspecting lumber at Prince Rupert to determine its suitability for aeroplane construction. During the war, the high character of this inspection, on which human lives depended, won universal commendation.

factor of safety to permit some defects in the material. In aeroplane construction, however, the reduction weight and wind resistance to the minimum is of such paramount importance that the size of each component must be so reduced that only flawless material can be used. The stresses are carefuly computed for every portion of the various parts, and all unnecessary wood is removed as shown in the illustrations.

In addition to the ordinary defects recognized in lumber, "angling" grain is perhaps the most serious defect in aeroplane wood. By sawing parallel to the bark it is comparatively easy to get the grain formed by the annual rings to run straight, but there is a tendency for trees to grow in a more or less spiral form which causes the fibres to angle across the flat grain or tangential faces of sawn lumber. Except where the spiral is very slight, it is impossible to correct this by any method of sawing. On account of these specially rigid requirements, the percentage of any kind of lumber that can be used for this purpose is very small.

Civil Aviation's Wood Needs.

Though with the cessation of the war the demand for wood for aeroplane construction has practically ceased, there is no doubt that commercial aeronautics will develop into a very important industry demanding large supplies of high grade wood. A great number of kinds of woods are used for different purposes, but for the framework of the wings and fuselage, spruce has been found the most suitable on account of its combination light weight, tensile strength, flexibility and resistance to shock and splitting. Of the American species, white spruce, red spruce and Sitka spruce have been found almost equally satisfactory, but the higher percentage of clear and the large sizes obtainable in the Sitka spruce make it by far the most important species.

The difficulty of securing sufficient spruce of the required quality led to

the use of other woods during the war. Douglas fir and Port Orford cedar proved quite satisfactory, and it was found that even several of the western firs, and the various white pines could be used to some extent.

Wood Propellers and Skids.

Hardwoods are used for propellers, engine bases, skids, packin pieces, etc. Though walnut and mahogany are considered the best woods for propellers, it was found that oak, beech, maple and ash could be used where the requirements are not too exacting. Ash, especially white ash, is used extensively for longerons, bent work on wings and fuselage, landing skids and other parts of the framework.

In view of the special efforts required to secure enough aeroplane wood to meet the war demands, it is of interest to consider what the possibilities are of meeting the demands which may be made in the future.



This is what is called a "spiral grain" spruce log. Because the tree grew with this defect, all such logs were discarded for aeroplane manufacture and indeed for nearly any other timber purpose.

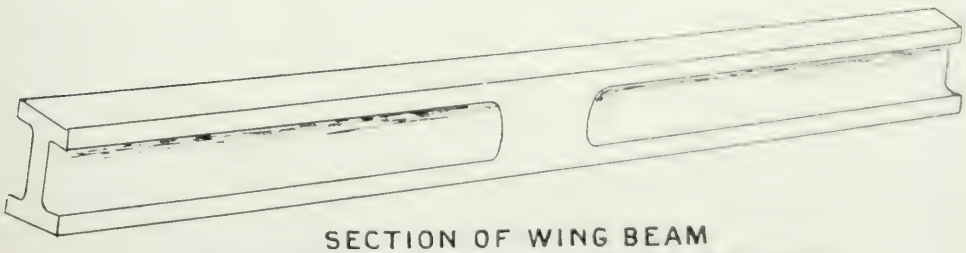
How Much Sitka Spruce?

There is estimated to be still about 13,700 million board feet of Sitka spruce in British Columbia, 9,400 million feet in Washington and Oregon, and from 15,000 to 18,000 million feet in Alaska. A considerable proportion of this timber is so situated that it will not be commercially accessible in the near future, and most of it is so scattered in stands with other species that it cannot be profitably taken out except as the other timber is logged. Unless another emergency arises, the supply will have to be secured from the ordinary annual cut. If it had been necessary to continue the production in British Columbia at the rate attained by the end of 1918, through the concentration of efforts, the available supply of aeroplane spruce that could be secured at a reasonable cost would have been exhausted in a year or so.

The United States Spruce Production Corporation opened a considerable source of supply by railway con-



INTER-PLANE STRUT



SECTION OF WING BEAM
CHANNELLED OUT TO REDUCE WEIGHT

struction, but very little development of the Alaska forests has yet taken place.

The normal annual cut of Sitka spruce in British Columbia for both pulp and lumber is about 90 to 100 million board feet; in the Pacific states 290 to 300 million. If all of the lumber suitable for aircraft construction were secured from this, British Columbia might supply from five to ten million, the Pacific states 20 to 30 million, and the Alaska forests might furnish a million feet or more if the contemplated development is realized. It requires such special care in sawing to recover all of the clear, straight-grained wood that it is not to be expected that a high percentage of it will be saved, unless very high prices are offered for it. It should be possible, however, to obtain one or two million feet of beam stock a year in British Columbia, and three or four million feet in the Pacific states for many years.

Engelmann Spruce

If Engelmann spruce is found upon further investigation to be satisfactory, British Columbia has 566 billion feet, with an annual cut of about 30 million feet, of which a small percentage would meet the aeroplane standard.

Eastern Spruce.

In the report of the United States National Advisory Committee for Aeronautics, the supply of spruce in the eastern states is estimate dto be 14,500 million feet, with an annual cut of 725 million board feet. The percentage of this which can be used for aircraft construction is said to vary from 3.9 per cent. in Maine, to 8.2 per cent. in the southern Appalachian Mountains, but it is very doubtful that this proportion could be secured.

There is no reliable estimate of the amount of saw material in the spruce of eastern Canada and the prairie provinces, but the annual cut of spruce lumber is about 1,400 million feet. If special efforts were made to secure all the aeroplane lumber from the eastern cut, it might supply from 20 to 30 million feet, but under ordinary conditions, perhaps perhaps four or five million feet could be secured.

Douglas Fir Supply.

The total supply of Douglas fir is estimated to be about 580 billion board feet, of which 75 billion feet is in British Columbia. The annual cut in British Columbia is now about 750 million feet, and in the northwestern states a little over five billion feet. During the war, when every effort was made to secure as much aeroplane lumber as possible from the commercial cut of fir, not more than two per cent. was found suitable for beam stock in British Columbia. On this basis, 15 million feet might be secured annually in British Columbia, and 100 million feet in the United States.

Port Orford Cedar.

The commercial stands of Port Orford cedar are confined to a narrow strip 20 to 25 miles wide along the coast in Coos and Curry counties in Oregon. The total stand is estimated to be only 750 million feet, and the total cut in 1917 was about 35 million feet. About 12 per cent. of the cut appears to be of aeroplane grade.

The better grades of grand fir, silver fir, noble fir and white fir may be used as substitute for spruce, especially in built-up parts, but the percentage suitable for aeroplane construction as solid wood, is comparatively small.

Western hemlock is also considered as a substitute for spruce, but it is heavier, low in shock resistance, and the percentage of clear is small, so

If thou art worn and hard beset
With sorrows, that thou wouldst forget,
If thou wouldst read a lesson that will keep
Thy heart from fainting and thy soul from sleep,
Go to the woods and the hills! No tears
Dim the sweet look that Nature wears. —Longfellow.



Photo, Courtesy Mr. E. E. Lemieux.

YOUNG LIVE CANADIAN BEAVER.

that it cannot be considered as an important species for this purpose.

White pine, western white pine and sugar pine possess certain qualities which enable their use for some purposes, especially in ply-wood.

Where for Black Walnut?

The amount of hardwood entering into the construction of an aeroplane is comparatively small, and there will probably be no difficulty in meeting any demand for this industry. The one exception in perhaps black walnut, which is considered the best propeller stock grown in North America. Estimates of the total stand are very unsatisfactory, but the best available figures show a probable stand of 850 million feet in the United States, including all trees over eight inches in diameter. The amount over 16 inches which will produce aeroplane material must, therefore, be very small. From 1914-1917 the cut was between 75 and 90 million feet annually, but it was greatly increased during 1918. Future cuts will be considerably below these figures. Extensive experiments have been conducted in splicing, lamination and plywood construction. It was found that [illegible] that they will have equal strength and stiffness to solid wood. This makes it possible to use inferior woods when protected by layers of stronger woods and also short clear pieces, which would otherwise be discarded, and effects a considerable saving in the actual amount of wood used. The cost of construction is higher, however, than when solid wood is used, and it is difficult to secure the same uniformity.



A particularly engaging photograph of a walk in Stanley Park, Vancouver. Courtesy of Grand Trunk Pacific Railway.

How Fast Will My Shade Trees Grow?

By F. E. Buck, Central Experimental Farm

Relative Value of Shade Trees with Special Reference to Rapidity of Growth

The "growth tables" published in the March article indicated that as a rule the larger the ultimate size of the tree the greater the growth. This was borne out by actual results taken from growth records over a period of years.

In the same article the statement was also made that as a rule the greatest growth takes place when the tree is from six to nine years old. This statement is borne out by the growth records which follow.

Certain trees which appear in these tables are not recommended for street or general use in spite of the fact that in the tables they occupy a conspicuous place in respect to rapidity of growth. In several cities of the United States which issue "permits" to the residents before street trees can be planted, such trees as the Manitoba maple, poplars and several others are not allowed to be planted.

In the first table the poplar shows an average growth of five feet per year for four years. It dropped out of the race, however, before the second growth table was recorded, ten years later. This fact is signifi-



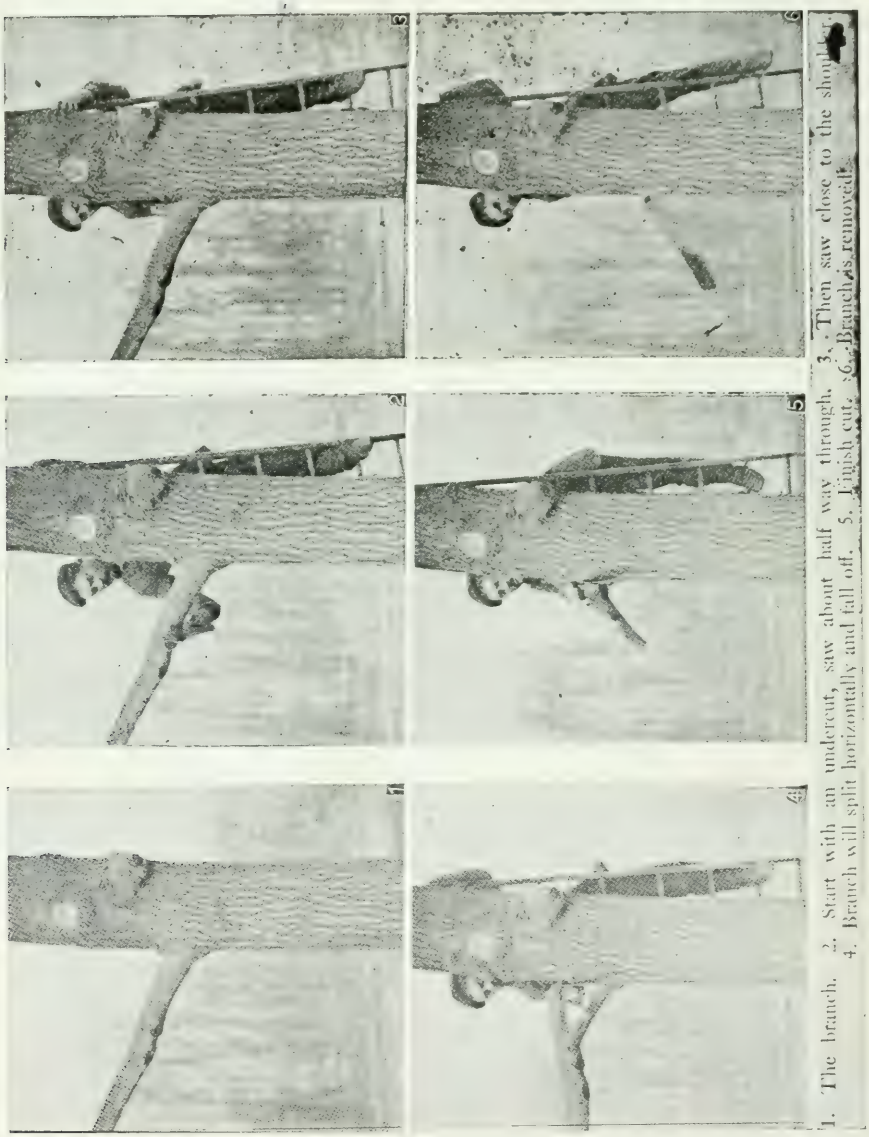
"The kindliest thing God ever made,
His hand of very healing laid
Upon a fevered world,
Was Shade."

cant! Trees which make abnormal growth are generally short-lived and subject to injury and disease. Their wood also is too brittle and breaks off in storms, becoming a source of danger to the citizens.

Measurements of Trees Planted 10 Feet Apart, giving the Average Growth per Year for a Period of Four Years. Soil Conditions Very Variable.

Name of Variety	Average Growth Per year	Greatest Growth in One year	Smallest Growth in One year
	inches	inches	inches
Sugar Maple	11	24	4
Silver Maple	35	58	18
White Birch	37	60	12
Canoe Birch	28	50	15
Yellow Birch	32	55	15
American Elm	29	52	10
White Ash	38	60	20
Black Ash	22	49	7
Green Ash	25	29	11
Red Ash	29	48	10
Manitoba Maple	30	44	18
Plane Tree or Sycamore	30	30	14
White Poplar	60	81	45

HOW TO PRUNE A TREE



1. The branch. 2. Start with an undercut, saw about half way through. 3. Then saw close to the shoulder. 4. Branch will split horizontally and fall off. 5. Finish cut. 6. Branch is removed.

From Solatarоff's "Shade Trees in Towns and Cities."

NOTE.—This period was from 1892 to 1896, the trees in most cases then being about five to seven years old, and planted three or four years previously. This is the age when trees make most rapid growth.

Another Four Year Period of Growth 10 Years Later, Giving Average Height in 1910. The Trees in 1910 Averaged about 22 Years Old.

Name of Variety	Average Growth Per year	Greatest Growth in One year	Smallest Growth in One year	Average Height in 1910
	inches	inches	inches	ft. in.
Sugar Maple	6	12-18	2	19 6
Canoe Birch	7	12-14	no growth	36 3
Yellow Birch	9	12	4	32 2
American Elm	7	23	5	26 7
White Ash	8	23	5	33 4
Black Ash	17	27	2	30 2
Green Ash	7	12	2	29 9
Red Ash	12	14	8	33 9

Comparing the two tables it is interesting to note that the amount of growth in the first of the two "four year periods" was double or more what it was in the second period. At the end of the first period the annual growth became less and less until it reached an average annual growth of about twelve inches.

The kind of season has a great deal to do with the amount of growth. In some seasons a tree may grow only a few inches, and the next year its growth may be four or five times greater.

The soil has a most important influence on rapidity of growth. Unfortunately the trees listed in these tables are not grown in the same type of soil, consequently the results in some cases are apt to appear to conflict with the general statements. The soil around the Experimental Farm on which these trees were grown, varies in character from a light sand to a heavy clay, with several intermediate types.

On other parts of the Farm many other varieties of trees are growing under experimental conditions. While very few are really suitable for street planting, a few should be mentioned which can be highly recommended for use around the home.

(1) The fastest growing and of large size:

Laurel-leaved Willow (the best of the Willows).

Cut-leaved White Birch (in some localities).

Lombardy Poplar (for special effects).

Black Walnut (in some cases).

(2) Medium fast growing and of medium size:

Pin Oak.

Mountain Ash.

Catalpa (not very hardy).

Butternut.

Purple-leaved Norway Maple.

Flowering Crab Apples.

Maiden-hair tree (suitable for streets, but rather slow growing).

Kentucky Coffee Tree.

Please send in your membership fee promptly.

The members are responding splendidly to our new plan of a Two-dollar Annual Fee, including subscription to the Forestry Journal.



Wild geese on premises of Mr. Jack Miner, Essex County, Ontario.

Wild Life Sanctuaries and the Game Supply

By Jack Miner, Kingsville, Ont.

I have camped out in Canada for thirty-four falls in succession, remaining in the wilderness places from three to nine weeks each trip, and have hunted at nearly every dropping-off hamlet between Lake Temiskaming and Fort William. Here we have fully a quarter of a million square miles of the most substantial Red Deer country in America, lying practically idle because of the devilish timber wolves that devour the deer before they acquire an adequate start. Why do I say this is the best deer country in America? Because this same little game animal in the Southern States seldom weighs one hundred and twenty-five pounds. Here in Southern Ontario it was a large one that weighed one hundred and seventy-five pounds. But in Northern Ontario I have often shot Red Deer that weighed two hundred and forty pounds, and as high as two hundred and fifty-three pounds. Better still, I never observed a deer in Northern Ontario that was not in the pink of condition. Therefore, I know from experience that this vast area of country is ideal for Red Deer. Time and again have I known a family of Red Deer to start up near the railway track between Chapleau and Fort William, and, possibly, there would be six or eight together previously to discovery by the wolves. After that this band of deer would not survive two nights, and these conditions have been going on for the past twenty-five years, and today the purchasing value of the bounty paid on one of these Red

Deer exterminators is not half what it was ten years ago. Kill off the wolves and within ten years our present scattered remnant of Red Deer will increase into millions. Then only will all of us realize and appreciate that our wild mutton is well worth conserving. Our deer are only one of the many wild life assets of Ontario that has received little or no attention.

At the present moment there are at least two hundred and fifty beautiful white swans and thousands of wild geese and ducks resting within three miles of where we now are sitting; all contented and resting under the sand-bar along the north shore of Lake Erie, where twenty years ago it was hardly safe for a sandpiper to alight. On the Kingsville Game Reservation, Bob-white, the farmers' most loyal and beneficial friend, can be heard plainly in increased numbers. Better education and a public sentiment brought about by the Essex County Wild Life Conservation Association, has made this wonderful change possible.

Every county in Ontario should organize an interested and enthusiastic Wild Life Conservation Association to co-operate with the governments. Then, and then only, can we hope to hold a representative annual convention near the centre of the Province, probably in Sudbury, or better still in Toronto, where the convention could be attended by all of our representatives to the Legislature. This undoubtedly would draw out and bring together the trappers, guides and sportsmen (the men who know frem experience), and put us in touch with one another. We could hold round-table or camp-fire talks, and square heart to heart conversation which, I believe, would bear fruit. We could consider the possibility of introducing among the wolves a contagious disease; also the advisability of introducing black foxes through the establishment in Ontario of black fox ranches for the purpose of re-stocking Northern Ontario with something worth while. If it pays to re-stock our lakes with fish-eating fish, surely it would pay to re-stock our forests with foxes worth five hundred dollars each, that do not consume as food, more partridges than a ten dollar Red one will. One of the finest black fox pelts I ever saw came from Northern Ontario.

PLANTING TREES IN N. Y.

Syracuse, N.Y.—The spring of 1920 is the biggest year yet recorded for forestry in New York State.

This was shown by the addresses at the First Annual Forest Week of the New York State College of Forestry at Syracuse, when five busy days were spent in discussions of various forestry programs.

Here were some of the big items of news of the week:

Monday, Public Forest Day.—The College of Forestry will alone plant big areas as follows, during April and May of this year: Otsego County, township forests, 50,000 trees; watershed planting, 50,000 trees; Malone city forest, 40,000 trees, chiefly pine; Chenango County, township forests, probably 30,000 trees; Herkimer county, many small plantings, depending on the number of trees that can be secured from the State, probably 50,000 in all; 30,000 trees in Lacona, N.Y.; 20,000 trees on the College of Forestry arboretum at Syracuse; 65,000 trees at Streeter Lake, under supervision of the State Ranger School.

Tuesday, County Agent Day.—Forestry College speakers declared that the State can provide from its woodlots, one-third of its lumber bill of $125,000,000 a year, land not now touched; the State College of Forestry at Syracuse will begin research development of 90 acres of woodlot near Syracuse.



TREES WILL PROVE THE GREAT STA BILIZER OF PRAIRIE POPULATION.
A Canadian prairie farmer, after 14 years of successful toil, decided to sell out and move to Ontario. He gave this bluff explanation of his action: "I'm hankering for the sight of trees. For fourteen years I have looked from my window on a world of what? Barbed wire! Barbed wire! My children are growing up to a landscape of what? Barbed wire! Barbed wire!" Suppose he had invested that fourteen years in growing a driveway as pictured above!



Getting a crop of young pine trees under way at Indian Head, Saskatchewan.

What to Plant for Prairie Tree-Shelters

By Norman M. Ross
Chief of Tree Planting Division, Indian Head, Sask.



With Tables Showing How Fast Various Trees Attain Good Height



In Manitoba, where the elevation is lower, tree growing is a much simpler matter than in Southern Alberta. In fact if one leaves out of account the probable injury from insects, the establishment of a shelter belt in Manitoba and Southern Saskatchewan is, provided the proper varieties are used and soil properly prepared, a comparatively easy matter.

As to varieties, the ones generally used are Manitoba maple, green ash, American elm, Russian poplar, cottonwood and Russian willows. We have other varieties which are very useful for ornamental purposes, such as birch and mountain ash, and which would also do well in shelter belts if young plants could be secured in sufficient quantities at a reasonable cost. Among the conifers, the Scotch, lodgepole and jack pines, the white spruce and Colorado spruce and tamarac are hardy everywhere. The balsam fir, black spruce, mountain dwarf pine, Cembra or Swiss stone pine, European larch and Siberian larch are quite hardy, but more useful for ornamental work, either owing to their habit of growth or to the difficulty of securing young stock.

In 1901 the Dominion government commenced a system of co-operative tree planting which has worked out very well and has become very popular among the farmers on the prairies. At that time, however, the Forestry Branch had many things to contend with: the general impression was that trees could not be grown, and for several reasons considerable difficulty was experienced in getting any farmers to start in on shelter belt work. There was a little opposition on the part of the nurserymen, which subsequent results prove to have been very short sighted on their part, as there is no doubt that the work of the Forestry Branch has enormously increased the general interest in tree planting and horticulture generally, and consequently greatly widened the demand for all kinds of nursery stock, more especially in fruits, ornamental shrubs and perennials.

From the plantations established on the Experimental Farms and the few private plantations that had survived, it was seen that certain methods gave good results, while if these methods were not followed failure was practically certain.

The Forestry Branch decided to supply trees to any farmer free of charge and express paid, provided that certain conditions were complied with. The conditions were:

1. That the ground be properly prepared before planting.

2. That the trees be planted according to the plan supplied by the department.

3. That the ground set out in trees be maintained as a permanent shelter belt and be properly fenced and cultivated.

There is no question that the most important feature with us is the preparation of the ground. Of course, the selection of the varieties is generally important, but as the department supplies the stock that feature is entirely controlled.



At five years of age Scotch Pine under prairie conditions will average 2 ft. high; at 13 years, 11 ft. high.

After carrying on this distribution for some seasons it was found advisable to insist that all ground for planting must be summer fallowed, so that now no trees are sent out for planting on garden land, back setting or stubble plowing.

In setting out the belts we arranged always that the trees be spaced approximately four by four feet. This feature aroused great opposition in certain quarters, and even yet it is largely a matter of opinion as to whether in all cases such close spacing is always best. However, considering the average conditions and the fact that the average farmer is very much averse to hoeing, and what may be called pottering jobs, it was thought that on the whole the plantations should be set out in such a way that they would most quickly take care of themselves if for any reason they happened to be neglected soon after becoming established. There is no question at all but that if trees are spaced eight by eight or ten by ten and given good cultivation, they will eventually grow into better individuals, and more rapidly than if set four by four feet. But the labor is increased enormously, and it requires several years more before the widely spaced trees are effective as a shelter. The greatest danger of wide spacing, however, lies in the probability that the farmer will fall down sooner or later in his cultivation, and that of course means the ruination of the belt.

The fact remains, however, that the four by four spacing has given excellent results. Where there have been failures, it cannot be placed to anything but lack of care in keeping grass and weeds from among the trees.

Since the commencement of the war conditions as regards labor have been such that there has been a natural falling off in the distribution of trees, but that is only a temporary condition, and each season farmers realize more and more the necessity for tree planting.

Since 1901 over forty million plants and cuttings have been distributed. We raise the stock on two nurseries, one at Indian Head and the other adjoining Saskatoon, both in Saskatche-



Wouldn't you pay a fat premium to get a prairie farm with such a grove of evergreens as this?

wan. Both of these nurseries have a capacity of from four to five millions annually.

The principal feature of our distribution is the inspection system, and the success of the scheme is due very largely to this inspection. As far as possible, every applicant for trees is visited, and no trees are granted unless the conditions comply with our regulations. Approximately 45 per cent. of applications are turned down each season, principally on account of lack of preparation. Eight inspectors are employed on this work. In the summer they are on the road from June to October, and during winter they work in the office preparing the distribution lists, planting plans, etc.

In regard to stock, we use only one year Manitoba maple, two year ash, one year caragana and uprooted cuttings of poplars and willows. We do not advise cutting back to the tops of the seedlings except the caragana, which when used for hedge must be cut back to the ground at time of planting. We strongly advise against any general pruning in a shelter belt, as it only means extra work and makes conditions for the growth of trees less favorable. The belt should be grown as thick as possible from the ground up. If pruning is done, it should be confined to the inside rows.

Evergreens are sent out at a nominal charge of one cent each, of $1.00 per 100. We use four year transplants of Scotch and jack pine, and five year transplants of white spruce. The demand is greater than we can supply.

At Indian Head we find that the growth of the more common trees, ascertained from hundreds of measurements made each year on the nursery, is as follows:

	At 5 years of age feet	At 13 years of age feet	At 16 years of age feet
Man. Maple	3	19½	
Green Ash	4½	14	
American Elm ...	4½	12¾	
White Birch	3½	20	
Russian Poplar ..	12	30	
White Spruce	2	7¼	13½
Scotch Pine	2	11	18¾
Jack Pine		10½	
Lodgepole Pine ...		8	
Tamarac	5½	17½	22¼
Siberian Larch ...	5½	20	

These ages are from seed or cuttings as the case may be, and all measurements are made in plantations spaced about four by four feet. No pruning or thinning has yet been found necessary in any of the plantations.

For general prairie planting the evergreens will, in my opinion, undoubtedly give the best ultimate results. Even in a dry season the growth is good, and once established they will withstand neglect that would be fatal to the broad leaf varieties.

PAPER INDUSTRY IN PROGRESSIVE STAND.

Legislation for a national forest policy in order to promote reforestation, which is regarded as essential for the paper industry, was recommended to the annual convention of the American Paper and Pulp Association by its committee on forest conservations.

General recommendations for a national forest policy, to be co-ordinated with state legislation, include:

Permanent annual appropriation of $1,000,000 to be applied only where the States co-operate, annual appropriation of $500,000 for forest surveys and land classification, permanent annual appropriation of $1,000,000 to acquire land suitable for timber growing, and permanent annual appropriation of $1,000,000 for forest planting operations in National Forests.



A Break in the Woods—one of the lovely natural pictures encountered in many parts of Nova Scotia.

How To Improve A Small Woods



by B. R. Morton, B.Sc. F., Ottawa

An Answer to a Score of Questions Through Forestry Journal Pages



What is the condition of your woodlot today? Examine it carefully. Does it contain the best kind of trees? Has the past cutting pretty well removed most of the better species, and made space for the less desirable? Are willows, hawthorns, ironwoods, soft maples, and aspen, occupying ground that might better be growing sugar maple, beech, ash, hickory, oak or white pine? Are many of the old trees dying, decayed, crooked, forked or so widely branched that they are holding in check the young trees beneath them? Are there open grassy spaces without any trees or are the younger trees in the open places so far separated that they are branched almost to the ground? Are the trees crowded so tightly that none of them can make proper growth? If any of these conditions prevail, your woodlot is in need of atention.

The conditions in woodlots are so variable that without making a careful examination it is impossible to give anything but general advice regarding their care. It is possible only to point out some of the things that should be borne in mind when undertaking this work. Much depends upon the judgment of the person in charge.

Protection Against Animals.

The first step to be taken in the care of the woodlot is its protection against injury by animals and fire. The grazing of stock in the woodlot is one of the greatest causes of its deterioration. The same piece of ground will not serve as a pasture, and remain a profitable woodlot for any considerable length of time. If it is necessary that your livestock should have access to shade, fence off a small portion of your bush and confine them to this. Goats, sheep, cows and horses destroy hardwood seedlings by browsing on them. Goats and sheep are the worst offenders in this respect. They will eat many woody plants not touched by others, and during the hot part of the day they stay in the shady part of the woods, nibbling at the small trees in preference to grazing on the grass growing in the sunny openings.

The injury done by livestock is, however, not confined to the young trees. As a result of the destruction of the underbrush the soil is exposed to the sun and wind. These, together with the tramping about of the stock cause the earth to become packed, dry and hard, and the rain, instead of being absorbed and retained for the use of the trees, runs off the surface, carrying with it much valuable humus which acts as a fertilizer. Shallow-rooted trees are seriously injured by having their roots exposed and barked. Much of the stagheadness, i.e., dead tops, is caused by this form of injury.

Keep Fire Out.

Fire should never be allowed to run through the woodlot. Many woodlots show traces of fire damage. These fires in most cases have been the result of carelessness on the part of the owner or his neighbor. Proper precaution was not taken when burning stumps or brush and the fire was allowed to spread through the leaves and underbrush. Some owners are short sighted enough to believe that

no harm is done if trees of marketable size have not been destroyed. They place no value on the seedlings and young growth which will be the trees of the future.

It is, however, not merely by the destruction of young trees that the fire does damage. Larger trees are also injured. Fires which at first sight do not seem to have done much damage, will frequently scorch the bark at the base sufficiently to kill the living tissue beneath it. The bark on these scorched patches, sooner or later drops off, and the wood becomes exposed to the organisms of decay. The destruction of the leaves and litter on the floor of the woodlot is also a serious loss. These serve as a fertilizer and act as a sponge in absorbing moisture.

Winds also cause considerable damage to woodlots by drying out the soil and over-turning trees. The borders of the woodlot should be completely banked up with branches and foliage to protect the interior. Trees growing along the edge should be allowed to retain their branches right to the ground and open borders and gaps should be closed by planting, if this is necessary.

Tree diseases are usually caused by parasitic fungi. The most common of these are those which cause decay. Hollow trunks, discolored wood, or those shelf or hoof-shaped projections frequently found attached to the side of trees and logs are indications of the presence of decay-producing fungi. These projections or 'punks' as they are sometimes called, are the fruits of the organism growing within the wood and causing its destruction. These bodies produce minute seeds or spores as they are termed, which are carried to other trees and infect them. For this reason decaying trees are a source of danger to others. The removal of the punks will reduce the immediate danger of the spores spreading, but will not stop the decay in the affected trees. Many of these decay-producing fungi are not capable of attacking a tree except through a wound, or where the bark has been broken, and, therefore, the needless blazing or cutting into the trunks of living trees should be avoided.

Stimulating the Stand.

In many woodlots which have been protected from cattle and fire, a dense even-aged growth of young trees has sprung up in the more open places. This is a desirable condition. In their youth the trees should be close enough together to force a rapid height growth and produce clear trunks. When about five years old they should number from 2,000 to 3,000 per acre. This number will gradually diminish, until at from ten to fifteen years of age they will number from 1,000 to 1,500 trees, and at maturity not more than 150 of the original trees will remain. Left to itself this thinning would come about in a natural way. The more vigorous trees will get ahead of their weaker neighbors, and sooner or later overtop them, causing them to die. Trees, even of the same species, differ in their rate of growth.

Nature, however, is slow and a little assistance by way of artificial thinning will stimulate the growth and concentrate it into a smaller number of the most desirable trees. Proper artificial thinning will shorten the time required for the trees to reach marketable size by ten to fifteen years.

In a woodlot containing many species the relative value of each species must be considered. The owner must decide for himself what species he is going to favor after he has given careful consideration to the adaptability of each species to local conditions. Generally speaking sugar maple, elm, white ash, hickory, white oak, beech, chestnut, red oak and yellow birch are the preferred hardwoods; while white pine, red pine, white spruce, red spruce, tamarack and cedar are the most desirable conifers.



A Ranger's cabin and lookout tower, north of the Canadian National Railways in the Cochrane, Ont., forest protection district. Photograph by courtesy of Ernest G. Poole.

The purpose of thinning is to stimulate the growth by giving each tree sufficient light and space to develop and yet keep a complete cover over the entire area of the woodlot so that the sun and wind will not deteriorate the soil. A large proportion of any tree has been derived through the leaves from the air and sunlight and foliage are very necessary agents in its growth. Shading or crowding which interferes with the development of the leaves must necessarily check the growth. To keep trees too long in a crowded condition is not advisable. Since other things being equal, the tree receiving the most light will produce the most wood. We must at the same time be careful and not go to the other extreme and grow our trees in stands which are too open, for our object is not merely to secure wood in quantity; we also desire quality. We require the wood in a form in which we can best use it. Ordinarily the form we most desire it in, is long straight trunks, clean of stubs and branches. We must, therefore, remember that trees grown too much in the open do not have desirable trunks, since it is characteristic for a young and vigorous tree to spread out and take all the space it requires, and to develop a low bushy head in a comparatively short trunk. To secure tall, clear trunks we must keep the young trees sufficiently crowded to prevent the crown or head becoming too spreading. We must cause the lower branches to be killed off by shading when they are comparatively small, so that they will leave no large stubs to form knots in the sawn material. By crowding the trees from the time they are quite small, and from time to time thinning them as they require it, we can retain a sufficient amount of shade to cause the pruning to take place but at the same time permit the tree to have enough light to keep up a good rate of growth.

Which Trees Need Most Light?

A woodlot composed of only a few species is much easier to thin properly than one composed of very many kinds of trees, and especially if they are of different ages. In the following list the trees have been grouped according to their light requirements. This order is not absolutely fixed, but will be found to vary somewhat in different localities. Young trees as a rule will tolerate more shading than those nearer mature. Trees growing on a site not suited to them will require more light than if they had proper soil and moisture conditions.

Shade Bearers: Sugar Maple; Beech; Hemlock; Balsam fir; Spruce; White cedar; Silver Maple; Red; Elm; Basswood.

Intermediate: Chestnut; Birch; White Pine; Black Walnut; Sycamore; Black Cherry; Oaks.

Light Demanders: Black Ash; White Ash; Jack Pine; Red Pine; Cottonwood; Tamarack; Hickories; Locust.

In the case of young stands of mixed species it is desirable to have some knowledge of each species requirements in regard to light and shade. Take for example a stand of young white pine and hemlock coming up together. The white pine being the more valuable it is the tree we desire to encourage the most. It is well, therefore, to know that the hemlock will produce more shade than the white pine, and we must favor the white pine when thinning, to encourage it to keep ahead of the hemlock. Should the hemlock become the dominant, or leading tree, the white pine will suffer by being too severely shaded.

In thinning, select the trees you desire to retain and then decide what trees should be cut to help the ones that are to remain. It is well to thin on the safe side and take out too little, rather than too much. One can always come back later and remove a few trees if necessary. It is a much more difficult matter to overcome the evil of too heavy a thinning.

It is a good general rule not to cut a tree if its removal will leave an opening which cannot be closed by the branches of surrounding trees in from three to four years. Begin to thin when the trees are still young, as soon as the lower set of branches have been killed, and repeat this thinning every five or six years. Light thinning every five or six years is better than severe thinnings made at longer periods. The average woodlot owner, however, will probably find it more convenient to begin thinning when the material is of sufficient size to make firewood or be used for some other purpose.—B. R. MORTON.

"CANADA FIFTY YEARS BEHIND."

Mr. Henrick Carbonnier, honorary attache to the Swedish Consulate in Montreal, has just visited the Laurentide Company's nurseries at Proulx, and some of the old cutting operations in the Peche district. He has also visited Price Brothers and the Belgo-Canadian operations. Mr. Carbonnier is making a tour of the continent, studying forest conditions for the Swedish Government, and will visit British Columbia, Washington, Oregon, California, the United States National Forests, and the Southern Pine Forests. While at the Laurentide Company's nurseries he expressed surprise that woods operations in Canada were not managed by technically trained men, and said that in Sweden all such work was under the direction of foresters. Mr. Carbonnier declared that in Canada we are passing through the same stage of handling our forests that Sweden did fifty years ago, and said that unless a change were made here in the methods of cutting, which he regarded as destructive, we would be in a difficult position in the next generation.



TIMBER SCARCITY? SURELY NOT.

Canada has burned down, through public indifference, 437 times as much timber as was cut in the whole of Canada in 1919.

And how much was cut last year?

Enough to make new wooden houses for one million Canadians.



PILING AND BURNING ON A LOGGING AERA.
Dominion Forestry Branch crew at work. Nisbet forest reserve. Saskatchewan.



HEAVY LUMBERING SLASH BEFORE PILING AND BURNING.

Fire danger extreme. At left is an area on which the debris has been piled and burned, thus greatly reducing the fire hazard. Nisbet forest reserve, Saskatchewan.

GOOD LUCK, ROYAL SCOTTISH!

Of the several well-organized and effective forestry societies within the British Empire, one of the most admirable is the Royal Scottish Arboricultural Society, with headquarters at Edinburgh, Scotland. Working along lines not essentially different from those of the Canadian Forestry Association, and aiming to interest land owners and the general public in all phases of forestry and arboriculture, the Royal Scottish Society has grown in influence. With such public measures as the organization of a Forestry Department under the British Government, in order to encourage reforestation and the constructive management of woodlands, the influence of the Society in shaping the legislation, and in safeguarding the particular interests of Scotland, has been substantial. Depending entirely upon voluntary contributions for its upkeep, the various educational activities nevertheless have developed potency year after year. The membership strength has steadily grown, new applications coming from all parts of the country. The Duke of Buccleuch is President of the Society and the executive direction is in the hands of Mr. Robert Galloway, S.S.C.

ORGANIZERS WANTED!

The Canadian Forestry Association will employ, at good remuneration, Organizers in the following cities: Vancouver, Victoria, Calgary, Edmonton, Saskatoon, Regina, Winnipeg, Toronto, Ottawa, Fredericton, St. John and Halifax.
A sterling opportunity for profitable and dignified employment. Applicants must have had successful records in some form of salesmanship.

206 Booth Building, Ottawa.



Ontario's real gold mines, had they been handled constructively. Photograph taken on the Trent Valley watershed where there are 389,000 acres in the condition shown by the pictures. Useless for farming, they once constituted the most valuable of Ontario's pineries. A few seed trees remain but not enough to re-establish a timber crop.

Can Canada Achieve Europe's Profits?



Relative area of the forests of Germany and Canada. The German forests have been built up from inferior waste lands and today produce a larger timber cut than comes from the whole of Canada.

Canada has more than 14 times as much forest area as Germany.

Canada's forests as a rule grow on better soils.

Canada cuts from 500 million acres three and a quarter billion board feet of lumber a year.

Germany, in normal times, cuts about five billion board feet from just 35 million acres.

In other words, Germany cuts more timber each year than Canada, and does so from one-fourteenth of our forest area.

Such facts are not in themselves very remarkable, considering that Germany has nearly eight times the population of the Dominion.

The kernel of the matter lies, not in what is taken out of the forests either of Canada or Germany. The recuperative condition of the remaining forest is the only factor that need engage our attention.

Investigative work on Canada's cut-over lands has not been very extensive, so that conclusions at best are of a general nature. Enough is known, however, to justify the assertion that Canadian forest tracts (particularly east of the Rockies), once cut-over, do not re-establish themselves satisfactorily. Second and third crops follow either not at all, or at too long intervals. The tendency is towards deterioration of the more valuable stands, a lowering of the yield per square mile, a process which, of course, cannot be contemplated with comfort by any forest owning government, or any wood using industry.

Their Re-investment Policy.

The purpose of this article is not to build up a case for the indiscriminate application of German forestry methods to Canadian forests, but to provide a simple illustration of the fact that both France and Germany have so operated their forest lands as to extract enormous annual harvests of logs while ensuring an increasing richness of the capital stock.

Germany's forests, like those of France, are the product of intensive scientific management, with control of cutting, and attention to the reproduction of the most valuable species.

While Canada has been cashing-in on a ready-made legacy of virgin timber, re-investing almost nothing in replacement account, France and Germany have put the chief stress upon re-investment, upon future profits.

As a consequence, Germany has doubled her forest capital in the last generation. Canada's forest capital cannot be said to be nearly equal to what existed a generation back.

Of Germany's 35 million acres of forest, 46 per cent. belongs to private individuals, 32 per cent. to the state, 16 per cent. to communities, half the remainder to the Crown and the rest to corporations.

Of Canada's more than 500 million acres of forest (about half that being of merchantable type), not more than ten per cent. belongs to private owners. The Crown enjoys regulative powers over the remainder.

In Germany, the first general forestry movement began about 1750, as



Forest fires have robbed Canada of at least seven times as much timber as has been cut. Dr. Howe estimates this useless sacrifice of national wealth at 1,091 billion feet (board measure) of useful timber.

a consequence of a temporary fuel famine.

In Canada, while certain protective measures against forest fires had an early origin, the idea of technical forest management to secure continuous forest crops was not seriously mooted until after 1900. Germany, therefore, has had far more than 100 years start in the application of scientific method in timber production.

The state forests of Prussia are 7,518,189 acres in extent. In 1913, the timber cut on this area was no less than 2,709 million board feet. In the whole of Canada the average annual lumber cut is about 3,250 million board feet.

Bavaria, in 1911, made a net profit of $4.12 per acre from her state-owned forests.

If Canada could cultivate such a revenue from even one-tenth of her Crown forests, public debt would be a thing to laugh at. There would be $100,000,000 alone from the relatively small forest reserves of the three prairie provinces, in place of a net deficit of several hundred thousand dollars.

Spending So As To Earn.

Of the 2,150,000 acres of forests in Bavaria, 77 per cent are coniferous, and the average value in 1912 was $50 an acre, or $32,000 a square mile.

Bavaria spent on forest management, $4,965,000 a year, more than double what is spent by all the Governments of Canada on forestry departments, fire protection, etc.

Bavaria's total net revenue from her forests in the same year amounted to $1,187,000.

Each German state has three classes of forests. First, those owned by the state themselves; second, those owned by the cities or small communities; third, those owned by private individuals. Most of the communal and private forests are regulated by the state, to some degree at least. One of the most important restrictions is that no private owner or community can cut more than is produced, and that all deforested land must be reforested.

The German forest policy aims to reforest all waste lands and to gradually increase the forest area under

direct state control. It aims to improve the education and training of foresters and rangers at the expense of the state and is seeking to extend fire and other forms of protection over all forest lands.

"The financial success of German forestry," remarks Prof. W. R. Lazenby, "depends mainly on two factors: First, good means of transportation; and second, that the owners, whether they be state, city or private, refuse to sell more than a small annual percentage of the stand. By doing this, the market is never overstocked, for the demand is always greater than the supply, and the price received is much greater than the cost of production, including the interest on the money invested at compound rates."

What Lesson for Canada?

No reader of this Journal will, of course, fall into the error of picturing Canada, at her present economic milepost, as able to multiply Germany's revenue, per acre, by Canada's potential timber-growing area. Germany's revenues, like those of France and Switzerland, are the product very largely of a keen local demand for wood materials in all forms, a restricted supply, and zealous management of the forest itself as the reproductive source of raw materials.

Canada, however, may read in the experience of European countries a prophecy of immense industrial development of vast public revenues, of increased population and an overflowing export trade, reared upon the pillars of an undiminishing forest.

When Canada has 50 millions of population, every square mile of forest will assume an economic importance now undreamed of. The older the world grows, the greater is its insistence upon lavish supplies of timber and pulp. Time, of course, will never alter the fact that 80 per cent. of habitable Canada is non-agricultural, and fit only for tree production.

Forests cannot be grown between spring and fall.

If Europe enjoys today the rich prizes of a century of constructive forest management, the time to plan for the Greater Canada of 1950 or 1990, in respect to its forest properties, is **Now.**



The Tree-bordered Shores of Lake of Bays, Ontario

Canada Has Lumbered 100,000 Square Miles

by Dr. C. D. Howe

According to Dr. Howe, Canada has lost through forest fires, 1,091 *billion feet (board measure) of useful timber. This amount, he estimates as* 437 *times as much as is yearly cut in Canada. The potential loss to the public treasury has been at the lowest estimate* $1,042,500,000.

Canadian lumbermen have cut about 100,000 *square miles of green timber.*

"The total area cut over by lumbermen in the past, outside of the area cleared for settlement, can only be approximated. If it is granted that the lumbermen have cut over 100,000 square miles of land, exclusive of lands occupied for agriculture or settlement, it would mean a total cut in the past 300 years of 192,000,000,000 board feet, at the low yield of 3,000 board feet per acre. This, in addition to the large quantity which has been cut from the 92,000 square miles of cleared farming lands, is certainly as much lumber as has been produced in Canada. Therefore, it may be assumed that lumbermen in Canada have not actually cut more than 100,000 square miles of green timber, if, indeed they have cut as much, when allowance is made for the area covered by fires which have caused their operations to be scattered.

"The original timbered area, omitting semi-treeless land, was approximately 1,900,000 square miles. Of this we have shown 98,000 square miles to have been cleared for settlement, and 100,000 square miles to have bee ncut over by lumbermen, leaving a timbered area yet untouched of 1,702,000 square miles. Assuming the average of 3,000 square feet per acre, there should yet remain 3,279 billion board feet of timber in Canada, at a very conservative estimate. On the contrary the highest estimate which has been made, that given by the Chairman of the Conservation Commission, the Honorable Clifford Sifton, places the amount of saw timber and pulpwood in Canada at 494,600 million feet, and 1,100 million cords respectively.

"By converting the pulpwood into board feet, allowing 500 feet board measure for each cord, it is found that there are standing in Canada only 1,094 billion feet of lumber, including the very low grades. The difference between this and the quantity which should yet remain is 2,185 billion feet." This quantity has been destroyed by forest fires.

"It is a quantity so large as to be beyond comprehension; it is 437 times as much as is yearly cut in Canada; it is 49 times as much as the combined yearly cut of the North American continent, north of Mexico. It means that for every foot of timber that has ever been cut in Canada by lumbermen, at least seven feet have been destroyed by fire. If the stumpage value is placed at the low sum of fifty cents per thousand feet (the smallest royalty collected by any Canadian Government), the loss to the public treasury has been $1,042,500,000. The actual money loss to the country has been many times greater, as several dollars are expended in logging, manufacturing and shipping every thousand feet of lumber."

THE "STICK OF GIANT."

The part that modern high explosives play in the lumbering industry in British Columbia is no small one. Their employment in road building, and in the removal of stumps and boulders; in the splitting up of huge logs, and the removal of log jams are but a few of the ways in which explosives are reducing labor costs and hastening production in the forests of that province.



"I Believe that 'God has lent us the earth for our life.' It is a great entail. It belongs as much to those who are to come after us as to us, and we have no right by anything we do or neglect, to involve them in any unnecessary penalties, or to deprive them of the benefit which was in our power to bequeath.'" (Ruskin.)

THE ASSOCIATION ENLARGES ITS PLANT

The Canadian Forestry Association has moved to its new and larger offices in the Jackson Building, recently constructed on Bank Street, Ottawa.

This is a year of expansion along all lines for the Association. All forms of educational work have been substantially developed. New classes of population are being reached, new enterprises have been set under way. It ought to mean a year of vital national service, provided that every member joins hands with the Association's permanent staff at Ottawa. The surest way of fulfilling your personal part in forest conservation is to make sure your 1920 fee of two dollars is paid.

Controlled Fires to Clear up Farm Land



A Successful Experiment on a Wholesale Scale in Northern Alberta



An experiment in wholesale clearing of farm lands by controlled fires was carried out by the Soldier Settlement Board last year in Northern Alberta, under the direction of Mr. Fred V. Seibert, D.L.S. The last issue of the Forestry Journal contained two photographic reproductions showing the nature of the work. Herewith is given Mr. Seibert's description of the operation. His conclusions are quite definite: That firing is a safe and economical method of clearing land for settlement where the country is covered with scrub poplar, willows, brule and windfall; that Spring fires can be controlled; that such controlled firing can be made of great practical advantage in protection of timber growing areas of brule and windfall.

We started work on April 15th and ceased operations on May 21st.

Our first work was to fireguard the area, and this operation was also conducted as an experiment. We tried every method that looked at all reasonable. We found that the choosing of the location of the fireguard was a large factor in its economical construction; that it wa snot advisable to follow section lines, but to follow open meadows, grassy knolls and creek banks even to the extent of going a few miles further. By starting fire-guarding early, as soon as the snow is off, one man with a torch and three or four men with good fire beaters, consisting of a wet blanket tied to an axe handle, can first go around the area and burn off the ridges which dry out first, then they can make a second trip and burn off the hay sloughs and widen out the ridges if necessary, and finally, where necessary, on a third trip, they can connect these areas already burned and so complete the fire guard.

Building Guards.

While our guard was in no place less tha ntwenty feet, in some cases it was from ten to twenty chains, and I have seen places outside the area experimented on, where it should be even more. The main thing in constructing a fire guard is not alone to comply with the regulations, but to have a guard of sufficient width to be absolutely sure that no fire will jump it. The width must be left to the discretion and good judgment of the men in charge, who, to be competent to judge, must have had considerable experience with forest fires. He must take note of all the conditions bordering on the fire guard that will assist in carrying live sparks over it. Dry standing stubs with dry light bark is an example of what he must look for. One such tree near the fire guard might be sufficient to carry the fire across. The fire climbing the stub will cause sparks to be blown off by the wind which, before they reach the ground may be blown many chains. Too great care cannot be taken with the fire guard, and it is always better to have it wider than necessary than a few feet too narrow.

When the guard was completed we started burning small areas, noting the results, for only in this way could we be sure of the best time at which to set the final fire in order to obtain the maximum results.

At the same time an area of standing brule and windfall, with a good mat of grass was chosen, and a line picketed through the centre in such a way as to equally divide the work of



Clearing Land on a Wholesale Plan by Controlled fires. A view before burning.



The Same View as Above After Burning.
(Samples of soil taken here showed no damage from fire.)

clearing. One side was cleared before it was burned, and the other after, and a strict account of the time and men employed was kept. This showed that the clearing before the fire took at the rate of one man forty-four (44) hours to clear an acre, and after the fire, one man eight hours for the same area. This means that it took five and a half times as much work to clear an acre before firing as it did afterwards, or, in other words, the cost of clearing was reduced by firing, over eighty (80) per cent., or $1.00 is doing what $5.50 did before.

On May 18th, when we considered that the time had arrived for the best results, we fired the whole area, or, to be more exact, that portion of it not burned over in the experiment prior to that date.

Soil Not Injured.

Six soil samples were taken before the fire, and from the same places six were taken after the fire. Here too, an effort was made to get as nearly representative conditions as possible. One sample, however, was given a very severe test, a much more severe test than would occur in actual burning operations. This sample was taken in the area previously mentioned, which was cleared before the fire. A pile of logs five feet high and ten feet wide was made over the spot, and when burned the flames went fifty feet into the air, and it was impossible to remain closer than one hundred feet. All tests showed practically no damage to soil, and in the case of the extremely severe test mentioned above there was an increase of organic matter. (Soil analysis made by C. J. Lynde, Professor of Physics, Macdonald College.)

To one not conversant with conditions in Northern Alberta these results are hard to understand. The ground at this season of the year is saturated with water from the winter snow, and the frost is out only near the surface. The hottest fire takes place where there is the thickest mat of grass and material, and it is here that the most moisture and frost is retained in the ground on account of the protection thus afforded from the warm rays of the sun. In the extremely severe test quoted above, the ground was still saturated with water, and the frost was only to a depth of six or eight inches. Where the ground has dried out it is because of the lack of covering and protection from the sun, and where the condition prevails there cannot be sufficient fire to burn the soil because of this lack of combustible material.

Now let us deal with the results of the main fire, set at a time when we had concluded from our daily experiments, that the maximum results would be obtained. Wherever there was a good mat of old grass excellent results were obtained. Most of the dry material, windfall andb rule not lying flat on the ground was consumed. That lying flat on the ground was in some cases consumed, but more often only reduced in size and burned through in several places, thus making it easier to handle. All green trees an dwillows are fire killed, and in some cases burned completely through. The results obtained were in direct proportion to the amount of old grass, which must be the chief carrying agent for the fire and source of kindling for the larger material. Of the twelve quarters experimented on, eleven are now taken up by returned men, and the only quarter remaining, I have reason to believe, is left because it is isolated from any other quarter open for entry. Most men prefer to take the full half section allotted to them. This land was takken because of its improved condition after burning.

OUR SPEAKERS' BUREAU.

If you have an opportunity to address audiences, juvenile or adult, in your community, we will be glad to identify you with our Speakers' Bureau and supply you with interesting lectures.

This is an opportunity for a vital public service in the cause of Forest Conservation.

Canadian Forestry Association,
Jackson Building,
Ottawa, Canada.

Ontario's Tree Incubating Plant

Probably in no other district in Ontario has reforestation taken such a grip as in Prince Edward and in Norfolk counties, for both of these have areas of soil which lends itself to no other branch of field husbandry.

It was with at least a degree of foresight that the Government opened the reforestation station in South Walsingham Township, Norfolk County, three miles north of St. Williams, in the year 1908.

At that time the seedlings propagated on experimental plots at Guelph were thansplanted to a more congenial soil, for at least the conifers, and six yaers later these had risen to a height of from eight to 15 feet. Today they are 20 to 25 feet high and four to eight inches in diameter at the base.

The Forestville Station.

The Forestville station, as it is called, is serving a double purpose. The plantation is about 800 acres in extent and while reforestation is carried on as an experiment, on a large scale, hundreds of thousands of trees are grown from seed and distributed free of cost throughout Ontario for reforestation purposes.

Already it has been demonstrated that light blow sand, upon which nothing else will thrive, a splendid covering of pines may easily be grown. Waste land becomes more attractive, productive and valuable, added windbreak is provided, and moisture is held in the atmosphere and the soil. But what is most important, new forests spring up to add to the ever-diminishing supply of timber.

But white pine is not the only species propagation at the Forestville station. Scotch, red, jack and bull pine, white cedar, hard and soft maple, white ash, black walnut, black locust, red oak, Carolina poplar and black cherry are some of the species grown. In fact, almost every species indigenous to Ontario is represented here.

During the past ten years those in charge at the station have done much experimental work along the line of seed selection, and have learned that local grown seed is most satisfactory. As in other branches of husbandry, it has been found that poor seed does not pay.

A Natural Arboretum.

Few counties in Ontario can boast of such a varied soil as Norfolk — everything from barren blow sand to heavy clay, and as naturally follows, few can boast of such a variety of timber—Rock elm, soft elm, hard and soft maple, varieties of beech, birch, walnut, butternut, chestnut, black, red and white oak, the poplar and willow tribe, locust, buttonwood and cherry are among the deciduous; the pines, balsams, cedars, spruces, larch and junipers among the conifers. How fitting, therefore, that the station should be located as to encourage propagation of forest on waste land or inaccessible areas desirable of reclamation, with such a variety of local grown seed available. The seed question at present is quite a problem.

Sowing the Seeds.

Seeds domestic and imported are first planted in beds with a protective covering of lath screen to prevent excessive heat and provide somewhat of an approximation to natural conditions. Broadcast or in rows, with a covering of a quarter of an inch or less, the evergreen seeds germinated slowly, as a rule, when sown either in autumn or spring.

The plants are left undisturbed for two years, the screens removed at the end of the first year and they are then set out in nursery lines. White pines are, at this time, about four inches high. The transplanting develops the root system. A year or two later these seedlings are ready for planting in the forest. Perhaps the planting out, which will be of most interest to those who have pursued this article thus far, is sufficiently described in the words of a prom-



"Parlor-car Forestry," as it is in real life. Gifford Pinchot once said that in New York State Foresters were to be found everywhere but in the forest. The true professional, however, usually wins his way only through actual woods experience. The photograph points out clearly the joy of life in a Canadian muskeg, 300 miles from a real town.

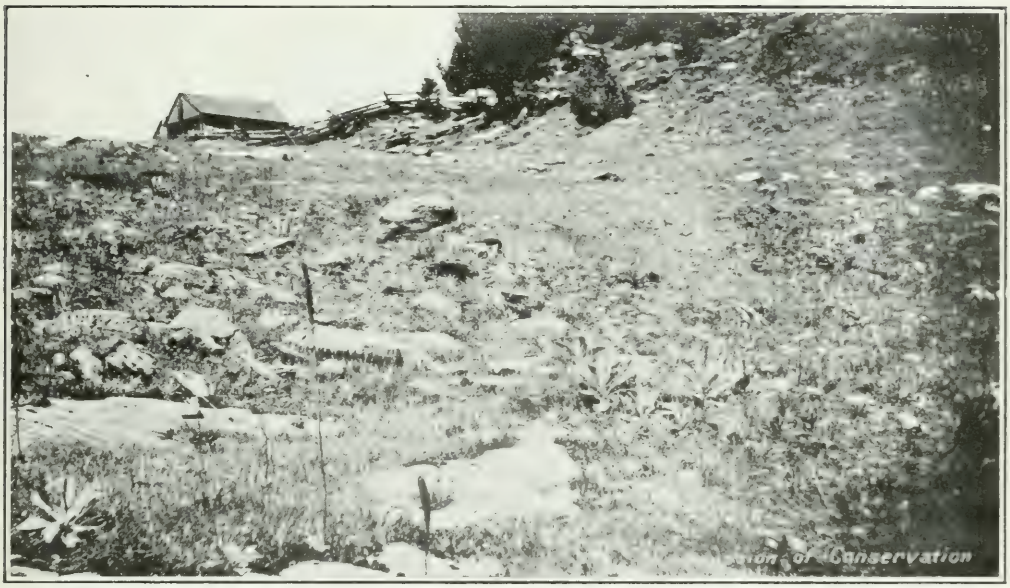
inent farmer of Norfolk County, who is also well versed in lumbering. W. A. Bower, of Simcoe, who has considerable holdings in the county, is one of those who has taken advantage of the Government's encouraging assistance towards reforestation. Interviewed by The Free Press a few days ago, Mr. Bower said: "I have planted white pine to reclaim light ridges, on more than one occasion. We got 23,000 pines about three years old, and from 12 to 18 inches high. There were seven of us with a team and plow. We plowed furrows five feet apart, following the plow with a spade and opening a slit in the bottom of the furrow, while another helper slipped a plant to the proper depth into the slit thus made and pressed the soil about it with his fork. The plants were set four feet apart in the furrow and the furrow was left to fill in gradually; 11,450 plants were set in one day and the four-acre lot completed in two days. No fertilizer was used and no cultivation whatever followed planting. In five years these trees were as high as a man and some of them three inches in diameter. A very small percentage failed to grow, but after some years there is a natural dying out through overcrowding, which earlier has served the purpose of preventing side brouchings."

Makes Good Investment.

Another Simconian, who brought 5,000 plants home in his Ford car protests that growing pine on land now waste, that should never have been laid bare is a better investment than life insurance.

But all varieties of trees cannot be grown on soil suited to their nature with the absolute neglect after planting that may obtain in the case of remantling blow sand with pine. And whatever be the variety, the transfer should be made as rapidly as possible, and the root fibres should never be allowed to dry off or be exposed to wind or sunlight longer than is absolutely necessary.

The black locust produces a splendid fence post which lasts longer than oak, cedar, ash or chestnut, and is now being grown at Forestville for this purpose in seven years. Hardwood varieties at the station, planted



Poor stuff for a farmer to give his time to: A pie ce of cleared land in Central Ontario which can never pay a profit until it is put back under timber. The maximum depth of soil is less than 12 inches.

in 1915, reach a height of 20 feet. Pine and locust predominate in reforestation area, and vacancies are the 1,620 acres now under attention, are being rapidly filled up.

There are at work on the plantation by winter, about ten men, and by summer, about 25. During winter they are engaged in removing from the old wood plots trees that show decay. This work is done carefully so as to inflict the least possible injury upon the under forest which is being nursed along to replace the old pioneers when they go down.

Then there are shipping boxes to be made for the spring, thinning here, the controlling of snowdrifts there—for injury to young trees through snowdrifts is kept well in check. There is gravel to be hauled, occasional buildings to be erected and general farm work to be attended.

With the spring shipping comes seeding and transplanting, or rather transplanting and seeding. Then vacancies in the woodland have to be filled in, and the summer brings the work of removing dead trees, and the pursuit of many lines of work—farm work, of course, but of a kind peculiar to the farm.

Up to the present only about 600,000 plants have been grown yearly, but in a couple of years it is expected that two millions a year will be available, and the increase will go on.

About five per cent. of the shipments of plants goes to destinations in Norfolk County. The remainder is distributed all over Ontario.

Rules for the Prairie Planter.

There are three main points which must be observed if success is to be hoped for. It is safe to say that at least ninety per cent. of the failures in tree-planting are due to the fact that the importance of one or of all of these features has been overlooked. The three points are these:

1. The soil must be most thoroughly prepared before planting.

2. Only such species of trees should be used as are known to be hardy in the district and suited to grow in the particular kind of soil and in the situation where it is desired to plant them.

3. A certain amount of cultivation of the soil after planting is absolutely necessary. This cultivation must be carried on until the trees are well established and able to grow without further care.

HIGH TIMBER PRICES IN FRANCE.

Stumpage value of the principal timber trees of France averaged five times those prevailing in the United States. Col. W. B. Greeley says that the U. S. army paid for maritime pine stumpage in the Landes, around $26 per thousand board feet. Oak timber of all grades in the Loire River Valley and in the upper watershed of the Marne, averaged $36 per thuosand on the stump. The silver fir and the spruce in the Vosges and Jura Mountains, timber averaging six or eight logs to the thousand feet, cost about $50 per thousand standing, while selected piling sometimes exceeded $90 per thousand. These war time prices were probably 75 per cent. more than the stumpage values in 1914.

"The price of forest products is high—in paper money. Spruce logs sell in the woods, 15 miles from the nearest railroad, at 2,000 marks per 1,000 board feet. Timber fit for furniture is beyond the reach of anyone. Nevertheless, the forest authorities do not cut more than the 'sustainable yield'—or as much as is replaced by our annual growth."

100 Yards of Ditch in Three Hours

—a better, cleaner and more satisfactory ditch than one dug with pick and shovel, and made in less time and with less labor and less money.

C. X. L. Stumping Powder

dug this ditch—it is digging ditches for hundreds of farmers, who have found the value of C. X. L. on the farm. Whether you want to drain or irrigate—whether your field is upland or swamp—the C. X. L. way is the most practical.

Use C. X. L. for stumping clearing your waste land and planting your fruit trees—it does the work easier, more economically and it helps to produce better and larger crops.

Our book "Farming with Dynamite" tells you how you can use C. X. L. profitably on your farm. Write for your free copy today.

Canadian Explosives Limited

Transportation Building
Montreal

There is money in Agricultural Blasting. Write for proposition.

16



PAPER & BOX BOARD MACHINERY

(FOURDRINIER AND CYLINDER TYPES)

PULP DRYING MACHINES
MILLSPAUGH SUCTION COUCH
MILLSPAUGH SHOWER PIPES
PRESS AND FELT ROLLS
GRANITE PRESS ROLLS
BRASS COVERED ROLLS

Davies Oscillating Suction Boxes, Barking Drums, Pulp Digestors

P.A.P.A. SCREEN (Spangengberg System) FOR PULP & PAPER

Dominion Engineering & Machinery Company Limited

MONTREAL, Que.

Works—LACHINE, QUE. Phone—WESTMOUNT G800

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Journal for your identification.

PRESENT CONDITIONS IN GERMANY.

In a letter to an American friend, Dr. Schenck, former head of the Biltmore Forest School, North Carolina, gives an interesting sketch of economic conditions in Germany at present:

Doctor Schenck declares that "German forests continue an A-1 asset. Our forest policy has been a conservative one, as you know. It reaps today what it has planted. Were it not for our forests the coal situation would be critical in the extreme. There is no coal whatsoever to be had for my house at Darmstadt; here in Lindenfels I have wood and some coke, enough for the time being.

"We require better economic conditions, safer than those now prevailing with reference to food and living. If our crops fail in 1920 there will be a disaster, a catastrophe by which the Black Plague of London is a million times repeated. Unfortunately, chances for reasonably good crops are few, and slight. There is no sugar to be had today; not an egg for the sick; no meat, of course—except for the rich and the very rich. Wages are high, but you cannot buy that thing for a stiff price which is not in any market.

"Our present forest policy continues to be conservative—much too conservative for me. If there were ever a time to empty a saving's box, that day has now arrived. Where the forests stand on farm soil they might well be converted into farms, although the authorities do not seem to approve of the change. Many of our forests might be thinned out twice as heavily as is customary, but the forester does not care to abandon the old practices.

DYNAMITE REJUVENATES A TREE.

Mr. P. L. Neel, of Philadelphia, purchased a place in Merion, Pa., which was vacant for about five years, heavily overgrown with grass and in bad shape. The grass was cut and all the dead wood removed from the beautiful shade trees. All the rotten cavities were cleaned out, waterproofed and then filled with waterproof cement, guy wires and bolts being used when necessary.

The question was how to most readily feed the roots of these trees so that the greatest results could be obtained in the shortest possible time. Realizing that if they were simply manured on the top of the ground and the rain allowed to act thereon, a great part of the nutrient qualities of the fertilizer would run off on the surface and simply be absorbed by the grass and upper strata of earth, the following method was suggested:

Dig a ditch at the tips of the branches about two feet wide and three feet deep, filling the ditch with alternate layers of composted manure, that is, a layer of manure on a layer of dirt and so on. However, it was further suggested that if the ground could be loosened up and manure placed on the top of the ground, this costly work could be avoided.

The most inexpensive, efficient and practical way of doing this was by putting charges of one half stick of

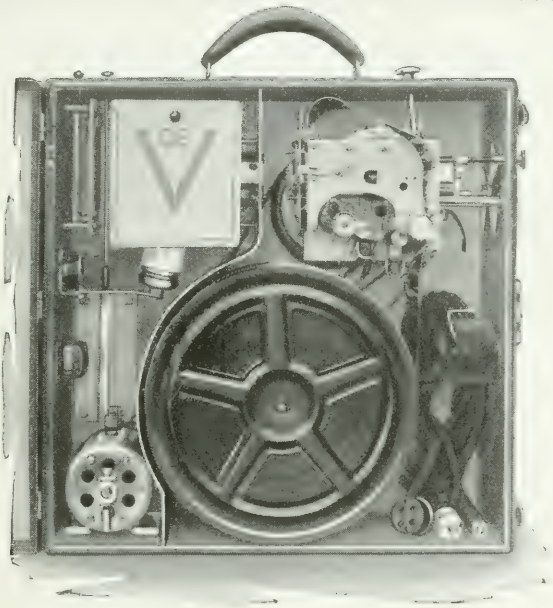
Forestall Colds, Chills and Influenza

TAKE

BOVRIL

Use Bovril in your cooking. It flavors, enriches, nourishes more.

The Body-building Power of Bovril has been proved by independent scientific experiments to be from 10 to 20 times the amount of Bovril taken.



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A **poor** machine kills the value of a **good** film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG

dynamite in a circle around the tree about ten feet apart, the circle following the line of the tips of the branches. This was done and the results were very gratifying.

This tree was found to be but a shell, the entire centre rotted out and twenty feet up into the branches. So badly was it gone that a professional landscape man gave it up as worthless, but Mr. Neel said he would take a chance. The undertaking was a complete success, with renewed life and beauty to the tree.

TIMBER RESOURCES OF POLAND.

According to the Polish Consulate General in London, the new Polish government is starting in on a campaign of interesting other European nations, especially Great Britain, in its forest resources. Poland's financial condition is deemed so critical that she has decided to put her forest resources, which are said to be enormous, on the market. The first installment of the timberlands which Poland proposes to offer for exploitation is said to contain more than 15,000,000 cubic meters. The plan seems to have been adopted of exploitation by the Polish government itself, which move is expected to lead large private timber owners to follow suit. It is thought that this decision may mean an opportunity for manufacturers of logging and sawmill machinery. Sweden, being a closer neighbor of Poland, will probably not overlook this opportunity. Most of the sawmill machinery in the Archangel region of North Russia is of Swedish make, even in mills owned by British capital.

TWO-THIRDS OF EACH TREE WASTED.

"At present two-thirds of the average tree is wasted before the wood is put to use," said C. P. Winslow, Director of the United States Forest Products Laboratory, in an address at a recent meeting of the Madison Section of the Society of American Foresters. "Without doubt, a considerable part of this waste can be used," he added, "and it is the function of forest products research to develop every possible new use, within the limits of the financial resources available for such work. Such better utilization also has a vital relation to the practice of forestry on private lands, by making possible a greater net return per acre, thus making continuous production of private forests more financially attractive than at present." Among the new uses of wood now being developed which may have profound effect upon future forest production, Mr. Winslow mentioned the use of "built-up" wood, in which small pieces of wood are glued together into laminated parts of various shapes and sizes, which can be made just as strong and useful as an equal amount of solid wood. The increasing uses of laminated wood make it reasonable to assume that many of the forests of the future can be profitably cut at an earlier age than at present with much closer utilization of the trees grown, thus naturally increasing the financial return per acre. The greater utilization of wood waste and wood in the smaller sizes for chemical products and paper pulp was also given as a fertile field for research.

THE SPANISH RIVER PULP and PAPER MILLS, Ltd.

SAULT STE. MARIE
ONTARIO

Manufacturers of
NEWSPRINT PAPER
HANGING OR WALL PAPER
BOARD PRODUCTS
GROUNDWOOD PULP
SULPHITE PULP

MILLS AT
SAULT STE. MARIE, Ont. ESPANOLA, Ont.
STURGEON FALLS, Ont.

Mention the Forestry Journal for your identification.

What Excess Growth in B.C. Really Means

In a recent issue of the Pacific Coast Lumberman, the report of the Commission of Conservation on "The Forest Resources of British Columbia," was interpreted as saying that the growth of new timber is five times the annual cut. Others than the Lumberman have jumped to the same general conclusion. Mr. Roland D. Craig, who played a chief part in preparing the report, has written an explanatory letter to the Lumberman and Forestry Journal readers will be equally interested in its contents:

"I notice in the leading editorial of your March issue that you refer to me as claiming that the growth of new timber is five times the annual cut. I should like to correct the impression that has evidently been taken from my statement in this connection in the report on the "Forests of British Columbia." I was careful to point out that there was sufficient forest land on which young forests are more or less completely established to grow about five times the amount annually cut, but that the realization of this increment in contingent upon the protection of the young growth from fire.*

"We all know, however, that every year thousands of acres of valuable young growth are burned over, not only destroying the existing growth, but seriously retarding or, in some cases, precluding subsequent natural reproduction. The public, and even many of those entrusted with the protection of the forests have not in the past appreciated the value of young growth. Not many years ago, while travelling up the coast with a fire ranger, I called his attention to a fire which was getting under way in a splendid young stand of fir about

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings — Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

Mention the Forestry Journal for your identification.

15 to 20 feet high. He said it was not worth bothering about as there was only small stuff and no "timber" there, and so the fire was allowed to run up the mountain side uncheckedd. This attitude is quite prevalent, even yet, among those working in the woods, and every effort should be made to bring about a more general recognition of the fact that this young timber will before long be in demand, and that it has a present value.

"There are several ways of valuing the young growth. If one figures on the cost of replacement by planting, young stands less than a foot high are worth at least $10 per acre. The Dominion Forestry Branch assigns the following arbitrary values for certain kinds of reproduction when fully stocked:

Age	Pine, Spruce, etc.	Poplar
Up to 25 years ..	$ 5.00	$3.00
25-50 years	10.00	6.00

If one applies only a proportion of the present stumpage value, based on the present age a scompared with the mature age, 10-year-old reproduction in the Douglas fir-cedar type should be worth between $3.00 and $5.00 per acre.† The Forest Branch reports of the areas of valuable young growth burned in recent years are interesting though the valuation placed on the young growth is very low, and it is reasonable to presume that it is impossible to secure complete reports as to the area of all the fires in this class of timber.

Year	Area acres	Value	Average value per acre
1914 . .	58,402	$18,355	$ 31
1915 . .	13,317	20,504	1 54
1916 . .	11,278	219	02
1917 . .	16,226	17,743	1 09
1918 . .	11,989	35,675	2 91
	113,112	$92,923	$????

To this must be adde dthe areas destroyed on Dominion lands.

"As to the basis of our estimate of the possible forest increment, I may

The FOX Seven Pound Portable Typewriter



A portable machine that will do all that a high-priced typewriter will do, and at the same time light and compact enough to carry easily. Will answer the writing requirements of almost any individual or firm.

Write for Descriptive Circular.

Price in Case
$75.00.

TYPEWRITER DIVISION,

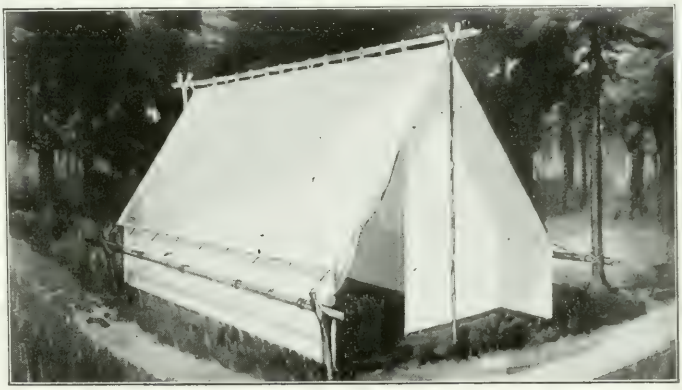
Photographic Stores, Limited

65 SPARKS STREET, OTTAWA, ONT.

Mention the Forestry Journal for your identification.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country

Very Easy Bleaching Sulphite

Spruce, Pine and Hemlock Lumber

Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Mention the Forestry Journal for your identification.

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador
Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL **Old Town, Maine.**

Mention the Forestry Journal for your identification.

ATTENTION! Fire Equipment, Limited, is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West - - - - MONTREAL

say that our investigations showed that out of approximately 149,000 square miles, which could be classified as forest land, only 52,000 square miles carried timber of possible commercial size an dquality. This leaves 97,000 square miles suiatble for the growth of forests and on which there is not a merchantable stand, but there is a very considerable amount of young forest already established. At the low annual rate of growth of 100 board feet per acre, at which it would take 100 years to produce 10,000 board feet per acre, this area could produce 6,200 million feet. No increment is to be expected on fully stocked mature stands, but there are, in addition to the above, 7,500 square miles on the coast, and 23,800 square miles in the interior on which there are comparatively light stands of mature timber, and on which there is also considerable young growing timber.

"It must be remembered that a large proportion of the reproduction in the province is comparatively young and will not be merchantable for 50 or 100 years, and that, even then, it will not attain the size which is demanded by the trade at the present time. However, when it becomes more difficult to get the fine old timber we have been accustomed to, the standards will doubtless change as they have elsewhere.

"As pointed out in our report,‡ we have very little definite information as to the extent of the natural reproduction or the rate of growth of the forests under the different conditions which prevail throughout the province. Until careful research is conducted along these lines, we can only make broad estimates of the possibilities and cannot say with definiteness what is taking place.

"The Commission of Conservation is now conducting extensive investigations of the reproduction in the pulpwood areas in Ontario, Quebec and New Brunswick. This work is being carried on in co-operation with

FIRE HOSE FIRE EXTINGUISHERS
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.
30 St. Francois Xavier St. - - MONTREAL
REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

several private corporations including the Laurentide Company, Riordon Pulp & Paper Co., Abitibi Power & Paper Co., and the Bathurst Lumber Co. In addition to a survey to determine the extent and nature of the natural reproduction, permanent sample areas are established on which the conditions affecting the growth are studied and experiments in different methods of cutting are being conducted to determine the best and most economical means of securing a satisfactory reproduction. The importance of maintaining the timber supply is recognised to such an extent in eastern Canada that extensive planting operations are being undertaken."

*See pages 9 and 241, "Forests of B.C."
†See page 136, "Forests of B.C."
‡See page 160, "Forests of B.C."

GREAT DEMAND FOR FORESTERS.

Syracuse, N.Y.—America's realization of the urgent need for more forested land and a better utilization of the products of the forest has been demonstrated this year as never before by the call for trained foresters made upon the New York State College of Forestry at Syracuse.

This year's senior class numbers 26 men, some of whom returned from the army for the completion of their college work, men who are now available for professional work. In addition there are 24 juniors, who, according to the custom of the college are required to takek five months of practical work from May to October to be permitted to take their senior class work in the fall.

To care for these 52 men, the college has received calls from governmental and private concerns for over 300 men. There are so many calls for trained men that the graduates and juniors are not forced to decide quickly, but are able to make a selection of the best offers which are made. This 300 men demand is in adidtio nto calls for untrained men for general woods work.

PINE MEN SUPPORT RESEARCH

The U.S. National Research Council has received a gift from the Southern Pine Association of $10,000 to pay for the incidental expenses of a co-ordinated scientific study by a number of investigators of the regrowth of trees on cut-over forest lands with the aim of determining the best forestry methods for obtaining the highest productivity. Although some of these cut-over lands can perhaps be most advantageously used for agricultural purposes there is a large acreage of them which will yield better returns if devoted to re-forestation.

"Canoes that have made Maps and History."

EXPLORERS, TRADERS AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS

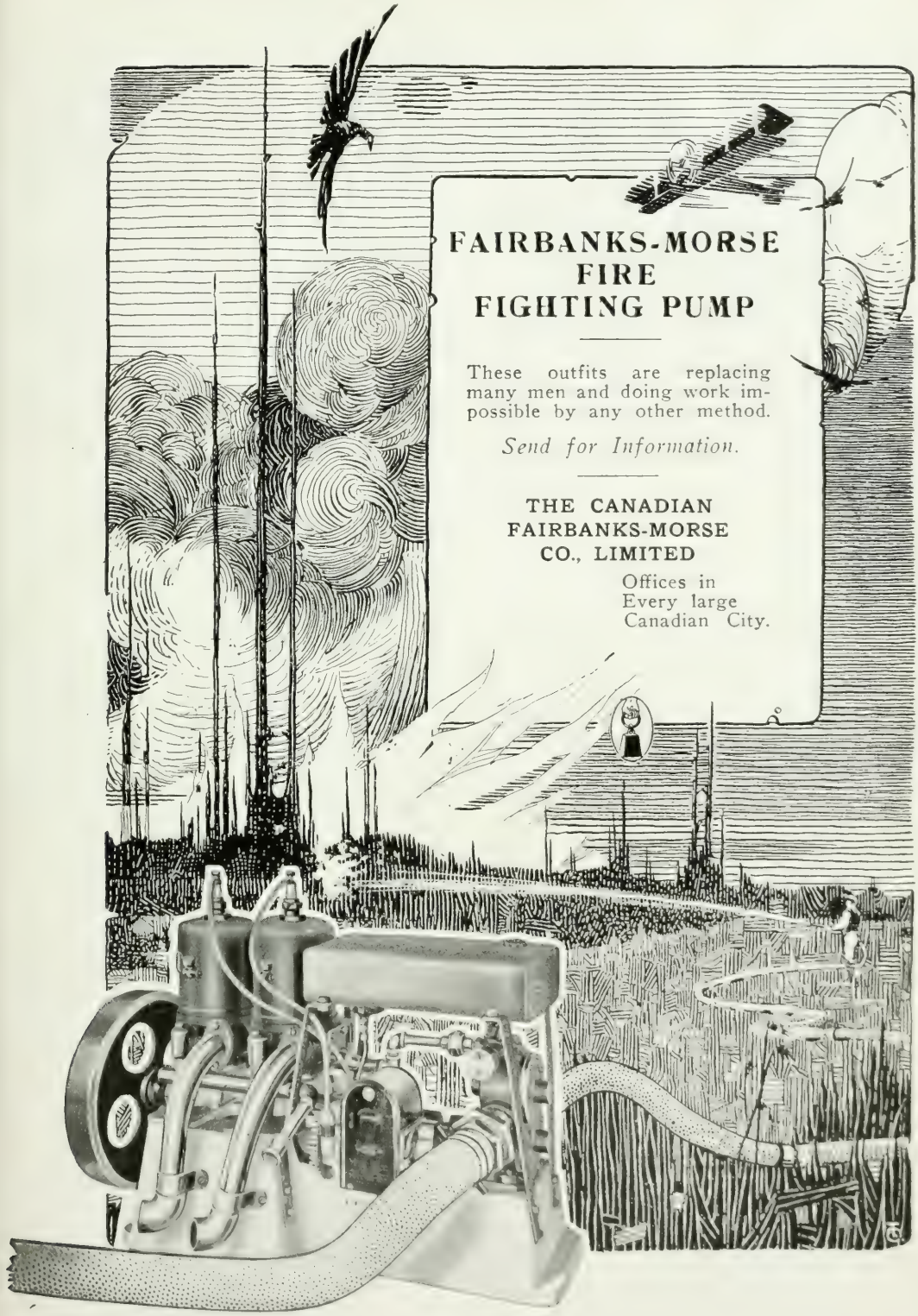
When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE & BOAT CO., LTD.

LAKEFIELD ONTARIO CANADA

Mention the Forestry Journal for your identification.



Mention the Forestry Journal for your identification.

ALBERTA'S FOREST FIRES.

While forest fire losses in Alberta last year aggregate $2,250,000 they would have been far greater but for the Dominion Forestry Branch and its officials and employes.

The last big fire previously occurred in 1910, when much more damage was done, for the reason that there was no preventive nor fire fighting service. In that year the fires swept from below the international boundary, far into the north, along practically the entire slope of the eastern Rockies. As there was no regular organization to combat the flames, the sporadic efforts of the settlers were almost useless. Two years later, when the Forestry Branch had been established, a different system prevailed, and since then until 1919, forest fires damage was comparatively light. In 1918, for instance, it was only $1,000 in the Alberta reserves.

Last year conditions were altogether against the fire fighting and preventive forces. The long drought left the woods dry as tinder, and high winds, which persisted for weeks at a stretch, fanned the flames beyond control. It was the experience in every instance that the Forestry Department officials and employes were on the ground of a fire within a few hours, usually less than four, of the time it was reported, and often they would not get away for days, so bitter was the struggle.

Five hundred and forty-eight thousand acres were swept over and the loss in merchantable timber has been estimated officially as being $500,000. Young timber was damaged to the extent of $1,370,000, and other growths $400,000.

"THE AGE OF WOOD."

It is a common experience to hear the present day referred to as "The Age of Steel." Modern industrialism, modern warfare and modern skyscrapers have given to steel a particular prominence. It is less generally understood that today is equally "The Age of Wood."

There is an intimacy, warmth and

LUMBERMEN ATTENTION!



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,
BATHURST NEW BRUNSWICK

WANTED
150 lbs. White Spruce Seed
(Picea Canadensis)
LINCOLN WOOD PULPCO.
Box 923 BANGOR, MAINE

TREES, SHRUBS and SEEDS
HARDY NORTHERN TREE STOCK
EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Mention the Forestry Journal for your identification.

comfort about wood that gives it a definite place in our affections that steel could never win from us. The varying grains of wood give them a character, almost a personality, of their own, around which we can weave stories of fact and fancy as we will.

Many regard trees as actual friends and feel their loss keenly if circumstances remove them from the presence of their beauty, strength and shelter.

The steel radiator, with its song of steam, will never compete with the yellow dragons and red demons to be seen dancing in a wood fire, or compare with the devil-may-care song of the flames—and the greatest stories in the world have had their birth and been told and re-told around the blazing log.

All the indoor drama of the romance of love and friendship has been enacted on a stage and against a background of wood, for the most part.

Even from the commercial point of view — newspapers, books, clothes, furniture, amongst other necessities and luxuries, are made increasingly from wood and its by-products.

The numberless objects of use and beauty in modern life that have their birth in wood are literaly the offspring of the axe, and, from this point of view, the logger may be regarded as the fairy godfather of our modern civilization.

Yes, this is "The Age of Wood."—H. B. C. in Pacific Coast Lumberman.

CEDAR

We are in the market at all times for clear EASTERN Cedar. We also buy clear cedar lath, special sizes.

If you are cutting any cedar write to us for particulars.

PETERBOROUGH CANOE Co. LTD
PETERBOROUGH CANADA

J

The JOST COMPANY, LTD.
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.

THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sta.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA





QUEEN'S UNIVERSITY
KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.



Ontario's real gold mines, had they been handled constructively. Photograph taken on the Thent Valley watershed where there are 389,000 acres in the condition shown by the picture. Useless for farming, they once constituted the most valuable of Ontario's pineries. A few seed trees remain but not enough to re-establish a timber crop.

OUR TREE PLANTING CAR.

Under the charge of Mr. Archibald Mitchell, an expert tree-planter and lecturer, who has studied prairie conditions for many years, the Canadian Forestry Association's Tree Planting Car will be ready, it is expected, by June 1st, for a tour of probably four months in the prairie provinces.

The enterprise is purely educational, and is being paid for wholly by the Canadian Forestry Association through its members and friends. It is not a Government or commercial undertaking in any sense.

Fuller details will be given in a direct letter shortly to be issued to all members of the Canadian Forestry Association.

The Association's second railway car will work through Ontario, Quebec and New Brunswick, promoting forest protection in hundreds of communities.

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL

The Forward Movement in Forestry

by Clyde Leavitt

Chief Forester, Commission of Conservation

(Continued from the March Issue)



A Careful Review of Measures Adopted Throughout the Dominion for Perpetuating the Forest Resources



The necessity for forest research as a basis for silvicultural practice is recognized by the British Columbia Forest Branch, which has provided definitely for this class of work in the administrative reorganization recently made effective.

Some of the pulp and paper companies are making a beginning at forest research work, independently as well as in co-operation with governmental agencies. For example, the Belgo-Canadian Pulp and Paper Company, through its forestry department, has made some experimental thinnings, with the particular object of increasing the rate of growth of spruce and balsam. Experiments along similar lines have been made by the River Ouelle Pulp and Lumber Company, in co-operation with the Quebec Forest Service, including also some experimental cuttings under the strip system.

It is greatly to be hoped that a large extension of forest research by the various administrative organizations, Dominion and Provincial, may be made possible by the appropriation of adequate funds. The field is so large that there need be no fear of wasteful duplication for at least many years to come.

DISPOSAL OF LOGGING SLASH.

For many years, it has been recognized that slash resulting from logging operations constitutes a most serious fire hazard. The great majority of destructive forest fires gain headway because of this accumulation of inflammable debris on cut over lands. It has been fully recognized that if this accumulation could be disposed of safely, at a reasonable cost the problem of forest fires would be well on its way to solution, to say nothing of greatly lessening the damage to standing timber by forest insects and parasitic fungi.

The Dominion Forestry Branch is the pioneer in systematic slash disposal in Canada. On all timber sales in the Dominion forest reserves, this is required as one of the terms of the contract. While others have been discussing the matter the Forestry Branch has gone ahead and secured results. Slash disposal is now generally in effect in timber sales on unlicensed lands in the Dominion forest reserves. Operators find that, once their men become familiar with the work and recognize that it must be done, the cost is by no means prohibitive and competition with timber cut under other conditions is quite possible. Of course, the stumpage revenues to the Government are somewhat smaller by virtue of this requirement, but forest officers regard this as a good investment. On Dominion Crown lands under license, however, this requirement is not effective, these lands not being under the jurisdiction of the Forestry Branch. In consequence, the fire hazard to forest reserve lands is greatly increased.

In British Columbia very considerable progress has been made toward slash disposal in the Coast region, and a beginning has been made in the Interior. This is largely the result of co-operation between the B. C. Forest Branch and the operators, though there is now legislation under which slash disposal may be made compulsory, the cost for the most part to be divided between the operator and the forest protection fund. On the Coast, broadcast burning is the rule, this involving comparatively little additional expense.

In the eastern provinces, however, broadcast burning is not feasible to any great extent, partly because of damage to the remaining undersized timber, and partly because in many cases the soil itself is highly inflammable. As a rule, under such conditions, slash must be piled for burning, and this necessarily involves material expense in addition to the cost of burning, which has to be done under careful supervision.

Despite the most common and early winter, several experiments in slash disposal have been under way in Ontario, Quebec and New Brunswick.

*Constituting the second instalment of the report of the Committee on Forests, Commission of Conservation.

In Ontario, slash disposal has been required in connection with two sales of timber, one to the Shevlin-Clark Lumber Company, in white and red pine, and the other to the Graves-Bigwood Lumber Company, on a tie operation in jack pine. While no specific figures of costs are yet obtainable, the indications are that, so far as these particular cases are concerned, the work is being handled at an additional cost which will be quite within the bounds of reason. Mr. L. E. Bliss, formerly Field Superintendent of Fire Protection with the Ontario Forestry Branch, is in charge of the tie operation for the Graves-Bigwood Company, and is fully confident that the experiment in slash disposal in question will be a complete success, at an additional cost not at all prohibitive.

In Quebec and New Brunswick, a number of comparatively small experiments have been made, among the companies concerned, being the Laurentide Company, Riordon Pulp and Paper Company, John Fenderson Company, River Quelle Pulp and Lumber Company and Bathurst Lumber Company. In the first of these the Commission of Conservation has co-operated with the company, and in the last it has co-operated jointly with the Bathurst Company, and the New Brunswick Forest Service, in both cases on experimental cuttings, to which further reference is made in the section on forest research.

While space prohibits a full discussion of costs in this report, it may be said that, for the most part, the results thus far are rather discouraging, as showing costs which are too high to be feasible for general adoption throughout logging operations, so long as present high costs of woods labor prevail. However, with wages reasonably normal, the cost would apparently not necessarily be prohibitive, if the work were handled to the best advantage. The most favorable figures thus far reported are those for the Laurentide experiment, where costs averaged around $1 per cord for pulpwood or roughly $2 per thousand for saw timber. Other costs are higher, in some cases, greatly so.

It must, however, be recognized that this work is still, in the east, in a purely experimental stage, that knowledge is still generally lacking as to the best methods of conducting such work, that woods labor is at present very expensive and sometimes far from efficient, and that, in some cases, such experiments have to contend with the natural conservatism of men accustomed through a lifetime to doing things in a particular way. In the conduct of such experiments, care has to be taken that such natural conservatism does not take the form of open or concealed hostility to the project, with consequent danger that costs will be made quite prohibitive. In any event, if success is to be expected, a good class of labor must be assigned, and there must be close and sympathetic co-ordination between the work of the felling crews, and the men assigned to slash piling and burning. That such a spirit should sometimes be lacking is perhaps not unnatural. Until slash disposal comes to be accepted as a matter of course — something which has to be done—the best results cannot be anticipated.

In the meantime, it is highly desirable that further experiments be conducted, on a commercial scale, in connection with regular operations, in order that the fullest possible information may be obtained. At least until some basis can be devised under which logging slash can be disposed of, it is quite evident that provincial governments must proceed slowly and cautiously in relaxing diameter limit restrictions and permitting clean cutting on Crown lands, since otherwise the fire hazard will be tremendously increased through the much heavier accumulations of inflammable debris on cut over lands, to say nothing of damage to present and prospective young growth.

At any rate there seems little doubt that it would be greatly in the interest of all concerned were there to be a general requirement for the disposal of logging slash along railway rights-of-way, wagon roads, main tote roads, driving streams, around camps and around the edges of cutting areas. The cost of this, when distributed over an entire operation, could not be prohibitive, and such action would greatly increase the chances of controlling fires in cut over lands and in preventing the destruction of green timber.

The disposal of inflammable debris outside railway rights-of-way is particularly desirable, since so many fires start along railway lines, due to outside agencies as well as to the railways themselves. In justice to the railways, as well as for the protection of outside property, the desirability of such action is quite obvious Legislation contemplating such action to at least a limited extent is in effect in several of the provinces, but has not been made generally effective, though some beginnings have been made for the most part on a more or less voluntary basis or through co-operation.

It is significant, in this connection that the St. Maurice Forest Protective Association has appropriated $20,000 to be expended in the disposal of inflammable debris outside the right-of-way of the Transcontinental Railway, through the holdings of its members in the province of Quebec.

The value of such work was fully demonstrated several years ago in Ontario,

when a strip outside the Grand Trunk right-of-way through Algonquin Park was thoroughly cleared of inflammable debris, through co-operation between the provincial government and the railway company. The notable reduction in railway fire damage in that territory is sufficient witness of the efficacy of the work.

DOMINION LANDS.

Throughout the period of the war, the technical work of the Dominion Forestry Branch was greatly handicapped through enlistments for overseas servcie. During the past year, however, this situation has undergone much improvement, though the Branch still finds it impossible to secure a sufficient number of trained foreseters to meet its requirements. Only a comparatively small number of men will be graduating this year from Canadian forest schools, so it will be at least another year, or perhaps more, before new men trained in forestry will be available in anything like adequate numbers to meet the pressing demands of the situation.

Since the beginning of the war, no additions have been made to the Dominion forest reserves. Additional large areas have been found, upon careful examination, to be unsuitable for agriculture and to be chiefly valuable for permanent timber production. The early inclusion of these areas within permanent forest reserves, by Act of Parliament, is highly desirable, in the public interest.

Settlers' clearing fires have always constituted a source of serious fire danger to the Dominion forest reserves. In Manitoba, Saskatchewan and British Columbia there is provincial legislation providing for the regulation of such fires under the permit system, which is also giving admirable results in all the eastern forest provinces. In Manitoba, and in the Railway Belt of British Columbia, this legislation is effective as to Dominion lands, because of co-operation between the provincial authorities and the officials of the Dominion Forestry Branch, under which the latter have authority as officers of the province to enforce the legislation. In Saskatchewan, while the fundamental legislation is in existence, co-operation between the two organizations is lacking, as a result of which Dominion lands have suffered unnecessarily from fire, in territory where no adequate provincial forest protective agency is locally available. In Alberta, on the other hand, there is no such legislation, and Dominion forest lands continue to suffer from unregulated clearing fires.

The Dominion forest products laboratories at Montreal, maintained by the Dominion Government, through the Forestry Branch, in co-operation with McGill University, have in the past rendered most valuable services of a public character. During the period of the war, much work of a most valuable character was performed in connection with the production of explosives. The peace time activities of these laboratories are calculated to prove of the greatest value to the lumbering and pulp and paper industries. As a result however, of war conditions, coupled with an inadequate salary scale, the work of these laboratories has been greatly disorganized through the loss of personnel. It is greatly to be hoped that the reclassification of the Dominion Civil Service now under way, may render it possible for these laboratories to be re-organized on an adequate basis, and thus to resume and increase their great usefulness to the people of Canada. The branch laboratory at Vancouver, maintained in co-opepration with the University of British Columbia has also done valuable work, and should be contniued.

BRITISH COLUMBIA.

The outstanding development of the year in British Columbia has been the reorganization of the Forest Branch. The re-arrangement of the personnel, and the revision of procedure, both in the head office and in the field, will result in greatly increased effficiency and will make it possible for the branch to fulfill its function of serving the public in a more adequate way than ever before.

The return from overseas service of quite a number of foresters who were formerly on the field and office staff, coupled with new accessions from other sources have made the reorganization possible. An important incident has been an upward revision of the entire salary scale, which will go far toward making it possible to attract and retain the best men. The salary scale now established sets the pace for all other governmental forestry organizations throughout Canada.

Legislation has been enacted which provides for the compulsory disposal of logging slash in accordance with the directions of the local forest officer. In case of lands contributing to the forest protection fund, the cost of such work is shared equally between this fund and the timber owner. Partly as a result of this legislation, approximately 120,000 acres of slash has been burned during the past year. The great bulk of this was in the Coast district, where broadcast burning is the rule and where the additional cost involved in slash burning is comparatively low, in many cases being practically negligible. In the Interior, there were three slash burning operations, totalling 1,875 acres which were burned at an additional cost of 84 cents per acre.

The past year has been a bad one for forest fires, the total number reported be-

ing over 1,100. Known causes in descending order are campers, logging operations, brush burning, lightning, railway construction and incendiarism.

Following the precedent so satisfactorily established nearly two years ago, the forest ranger course for returned soldiers has been continued at the University of British Columbia, under the auspices of the Vocational Board, in co-operation with the Dominion Forestry Branch and the British Columbia Forest Branch. This course has rendered a valuable service not only to the returned soldiers, but also to the forestry organizations which have employed the men.

There is the most urgent need for the establishment of a full-fledged forestry department at the University of British Columbia. Such action is under consideration by the provincial and university authorities, and it is greatly to be hoped that the necessary funds can be made available. When it is considered that the forest revenue to the provincial treasury is now well over $2,700,000, it seems perfectly logical that the necessary small fraction of this amount should be diverted to forestry education, in the interest of the future.

ONTARIO FOREST RESOURCES.

The survey of the forest resources of Ontario was commenced last spring under the supervision of R. D. Craig. On the return of Major G. H. Edgecombe and Mr. A. V. Gilbert from overseas, their services were secured to assist in this work. This project is receiving the active co-operation of the Provincial Government and all the records and cruises in the Department of Lands and Forests have been placed at our disposal. The Crown timber agents and other officials of the department have been instructed to furnish the Commission with the information which they have gained through long experience in the different regions. The timber owners are being asked to supply estimates of the amount of timber on their holdings and those so far approached have shown a most commendable willingness to assist in this work, which is recognized as being of vital importance to the lumber and pulp industries. The general recognition of an impending shortage of timber has caused a demand for more definite knowledge of existing and prospective supplies.

It is proposed in making the report on the forest resources of Ontario to divide the province into six main regions, the southern portion, which is chiefly agricultural, the Ottawa river drainage area, the Georgian Bay and Lake Huron drainage area, the Lake Superior drainage area the Lake of the Woods region and the Hudson Bay drainage area. Most of the work done this year has been in the Ottawa river and Lake Huron regions

In addition to collecting detailed reports from the lumbermen, provincial officials and others, the foresters engaged on this work spend considerable time in travelling through the various areas, in order to become familiar with local conditions so that the data collected may be intelligently compiled. This, of course, would be impossible if purely mechanical methods were used. The problems of forest regeneration and utilization are being studied with the object of determining if possible the best means of maintaining the productiveness of the forests.

This project has been endorsed by the Canadian Lumbermen's Association and by the Woodlands Section of the Canadian Pulp and Paper Association, through formal resolutions adopted at the recent annual meetings of these representative organizations.

FOREST RESEARCH.

The forest research work of the Commission, under the immediate direction of Dr. C. D. Howe, has been continued and extended. It has received the endorsement of both the Canadian Lumbermens Association and the Woodlands Section of the Canadian Pulp and Paper Association.

Field parties have made investigations upon the limits of the Laurentide and Riordon Companies, in Quebec, in continuation of co-operation previously established with these companies. These projects involve primarily the establishment and continued study of permanent sample plots and growth study plots, in addition to regeneration surveys.

In co-operation with the Algoma Company, a party spent the field season upon their limits in Ontario, in regeneration and growth study work, the party chief remaining five weeks longer, during the autumn and early winter to assist the Company's forestry department in the collection of further data, showing the rate of growth of spruce and balsam in that portion of the Algoma district. The regeneration studies are being conducted in order to determine the extent to which the various species are being reproduced naturally and the conditions which are favorable to the reproduction of the more valuable species, particularly spruce.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities

Corporation
Limited

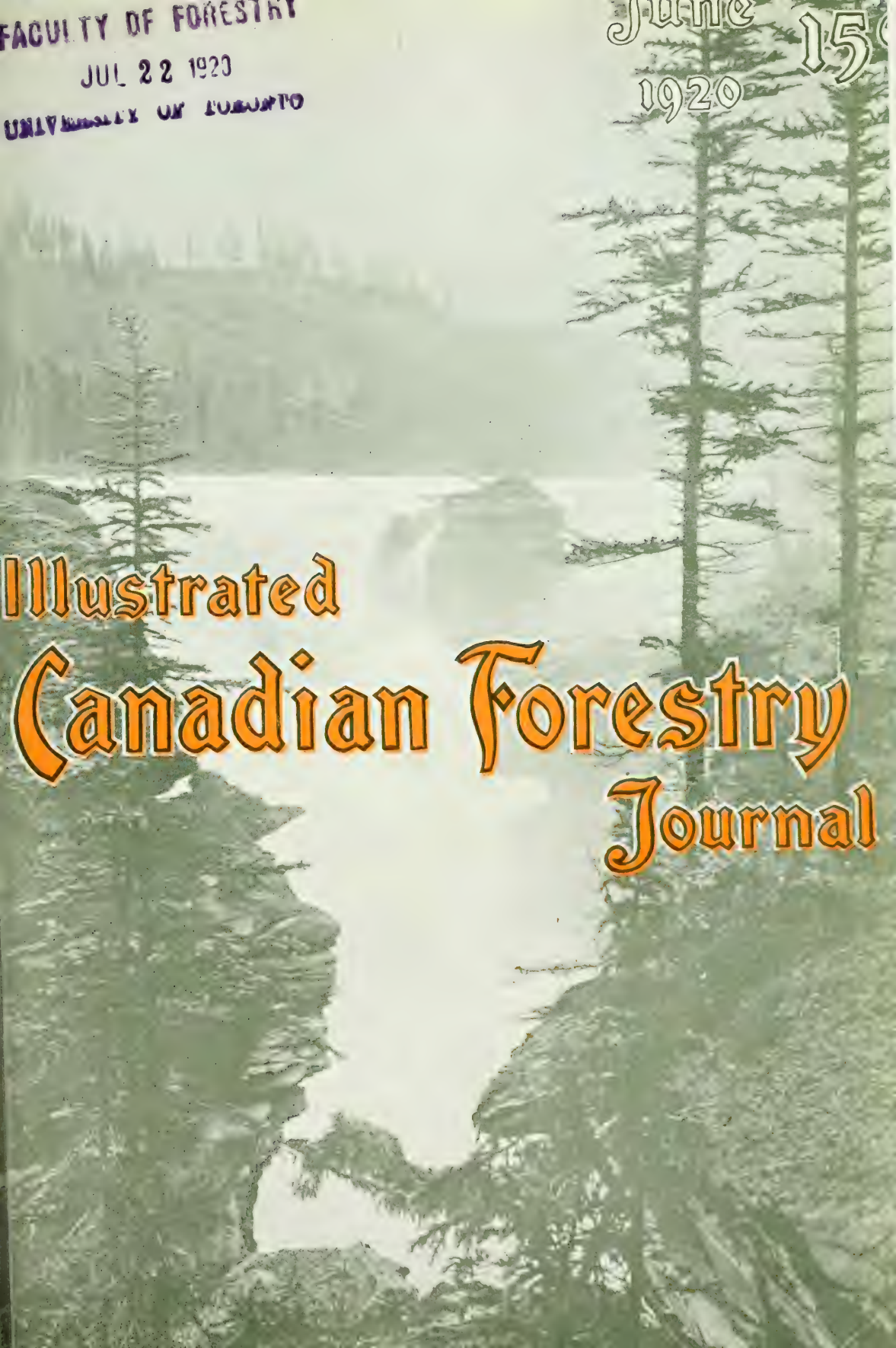
MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG.

Mention the Forestry Journal for your identification.

FACULTY OF FORESTRY
JUL 22 1920
UNIVERSITY OF TORONTO

June 1920 15



Illustrated Canadian Forestry Journal

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

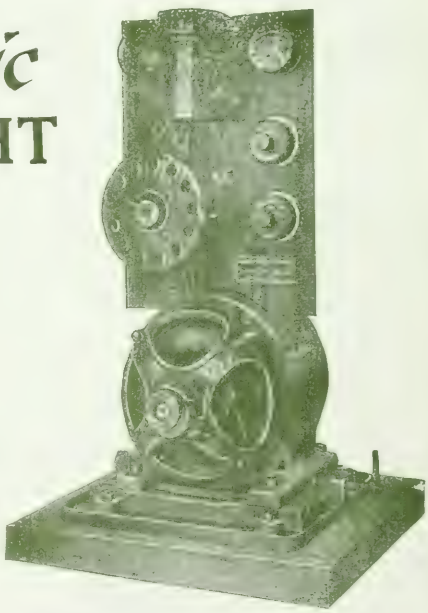
OTTAWA
CANADA
Dept. D.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

CULATION: 11,300 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Journal

VOL. XVI. KINGSTON, CANADA, JUNE, 1920. No. 6

Has the Hour Arrived for Constructive Forestry

By Ellwood Wilson, Chief Forester; The Laurentide Company, Grand Mere, P.Q.



Quebec Government is now prepared to assist operators aiming at a sustained yield.



Canada has, in the past 10 years made great progress in the conservation of its timber resources and should be proud of it. By conservation I mean rational utilization and elimination of waste. Forest fires are not as frequent or as disastrous as formerly, though much can still be done along these lines. A beginning has been made at mapping and classifying our forests. A strong public sentiment has been aroused and much educational work done. In actual practical utilization however, practically nothing has yet been done, logging methods have not changed since lumbering started and much valuable wood and many valuable by-products are still going to waste. Logging is an engineering problem and should be carried out by trained engineers. In order to insure a supply of timber it must be carried out according to certain well defined principles which come under the head of Forestry. Lumbering should be conducted by forest engineers. There has been prevalent for many years the idea that only men brought up in the woods, who were rough and handy with their fists and had gained their experience by handling an axe or a peavy, could handle logging operations. As well expect a civil engineer to have learned his profession with a pick and shovel or an hydraulic engineer with a level and trowel. The trouble with the so-called practical man is that he has learned all he knows by experience and has generally no knowledge of underlying principles. When confronted with a situation which has never previously come under his experience he either applies his experience literally or is entirely at a loss. He works by rule of thumb or precedent. The trained man on the other hand, knows the fundamental principles and soon learns to apply them generally.

Now there is one basic principle underlying the use of our forest resources, that of a sustained yield. That is to say we have built up the lumber industry and the pulp and paper and wood using industries which are absolutely dependent on wood as raw material. It is inconceivable that after a period of years, only a moment in the life of a nation, we should scrap these industries. Take the Province of Quebec as an example. The great bulk of its area is good for nothing but to grow forests. Are we going to deliberately give up our lumber industry, our pulp and paper industry after fifty years? Where will our wood using industries get their supply of raw material? Where will our

farmers get the wood they need, where will they work in the winter months, how will our mineral resources be developed without wood? We must protect our forests from fire and we must manage them for a continuous yield. New industries are good but they must not be developed beyond a point where the supply of raw material ceases to be sufficient. The first essential is an accurate estimate of the total supply of wood and the total amount growing each year. When this is ascertained the consumption must be fitted to the annual production. It is only a question of time until this will be absolutely necessary and the Province which first has the courage to take the bull by the horns and handle its forest resources rationally will do most to stabilize its wood using industries and to perpetuate its prosperity. If this is not done, the time will inevitably come in eastern Canada when the forests will begin to dwindle and the industries to decline and we to take their place. We have only to look at sections of the United States which were once thriving communities and are now abandoned, for proof of this. We have only to see the situation of the news print industry in the United States and to hear its cry that its raw material is nearly exhausted and that they must have Canadian wood in order to exist to know the truth of my statement. The Canadian pulp and paper industry realizes this and has come to realize it through a careful stock-taking of its timberlands. See how many of the large companies are beginning to reforest artificially!

CHANGED WOODS METHODS

But, and here is a very important query, why do they not change their methods of logging, why do they not utilize more of the wood that is wasted? In not a country in the world is natural regeneration so easy and so certain as in Eastern Canada and it is absolutely necessary that natural and artificial reforestation should go hand in hand. The reason that no attention is being paid to natural regeneration or to better methods of logging, is that operators wish to keep down their logging costs, and the manager of woodlands operations is judged on no other basis than the price at which he delivers his logs. He makes his logs and delivers them as cheaply as possible and no one can blame him. The history of logging has been that it has followed the line of least resistance. Only the best timber was marketable, only cheap wood could go into paper in the early days or concerns would have been bankrupted. The most accessible timber was logged first, river banks and lake shores were cut clean, then the easily drivable streams. Logging was contracted because it could be done cheaper by a small contractor and required no capital outlay for logging gear and so forth. The waste by these jobbers has been enormous. They have taken the best of the timber and left that which was difficult to get out and now this timber is scattered and difficult of access and the price of getting it out would be almost ruinous. Everyone is looking for new bodies of timber to log cheaply.

PRICES AND FOREST METHODS

Now while prices are good, when there is a market for all kinds of wood, is the time to make a radical change in the management of our forests and in the methods of exploiting them. We must begin to manage for a sustained yield and most of the large paper companies are carrying on experiments looking to this end. Different methods of cutting have been tried and the results are being studied. Such methods have been carefully worked out in Europe and have the sanction of experience. Here it will take years to develop the best methods but we know enough to begin and a beginning should be made at once.

NO BLANKET SYSTEM

Let it be stated most emphatically that there is no **one** method for handling Canadian forests. That is the great mistake which our Provincial

Governments are making in the forest regulations. Imagine, for instance, making the same cutting regulations for the whole of a Province the size of Quebec or Ontario, where conditions vary so enormously. The Quebec Government realizes this and on application will examine any area and allow changes in the regulations. Each tract of a few square miles is a problem in itself and must be treated as such. Plans for cutting should be made ten years in advance and changed as experience dictates, but should always be made with the idea of cropping any given area continuously or of cutting it clean and reforesting it, either naturally or artificially. **This will raise the logging cost but, mark you, not permanently.** As the forests begin to improve and the crop becomes heavier and of better quality the costs will decline owing to a heavier yield and greater accessibility, owing to permanent roads and other improvements. The costs will tend to become stable and uniform over periods of time. The Province or firm which commences such sensible management will be cutting timber near at hand and cheaply, relatively, when others are looking to Labrador, Ungava and Alaska for small trees which may or may not prove to be in existence.

The question has been asked, are we ready to undertake such management of our forests? I say that we are, that the psychological moment has arrived when we should lay the foundations for a sane and practical forestry policy which will make Canada the greatest pulp and paper producing country in the world FOR ALL TIME.

THE WORLD'S FORESTS

The forest lands of the world are estimated to amount to about 4,000,000,000 acres, or about 24 per cent. of the world's total land area. This estimate does not include the forest areas of China, Korea and the larger part of South America and Africa for which even fair approximations are not available. The United States, with about 545,000,000 acres under forest has 2,826 billion feet of merchantable timber, and its cut, which in 1918 amounted to 32 billion feet, is several times that of any other country.

FORESTRY IS THE KEY

By the adoption of practical forestry methods, the United States in the next half century without depleting the standing timber supply could meet all domestic demands for lumber and could export from twenty to twenty-five billion feet annually, says an article in the Commerce Monthly published by the National Bank of Commerce, New York. At present the timber supply of the world outside of the tropics is being used more rapidly than it is being renewed by growth.

CANADA AS A SHIP BUILDER

Interesting data on Canada's ship and boat building industry in 1918 is contained in a preliminary report by the Dominion Bureau of Statistics, covering 90 shipbuilding and 114 boatbuilding establishments. The amount of capital invested was $56,299,033, in the former branch and $1,145,906 in the latter. The thirteen shipbuilding plants of Ontario were shown to represent captal invested to the amount of $28,254,963; Quebec, nine plants, $14,423,090; British Columbia and Manitoba, $9,551,604; Nova Scotia and New Brunswick, $4,069,376. In the boatbuilding industry the distribution shows Ontario with $640,917, Quebec $65,259, the Maritime Provinces $291,-31, and the Eastern Provinces $148,-349.

HIGHWAY FORESTER

H. J. Moore, who resigned from the position of Chief Gardener of the Queen Victoria Park Commission, has been appointed by the Ontario Provincial Government, Forester of Provincial Highways. His work will largely be the beautification of roadways by planting shade trees and shrubs along them. His headquarters will be in the Parliament Buildings, Toronto.



In beautiful Prince Edward Island: a shade tree arrangement on Longworth Street, Charlottetown.

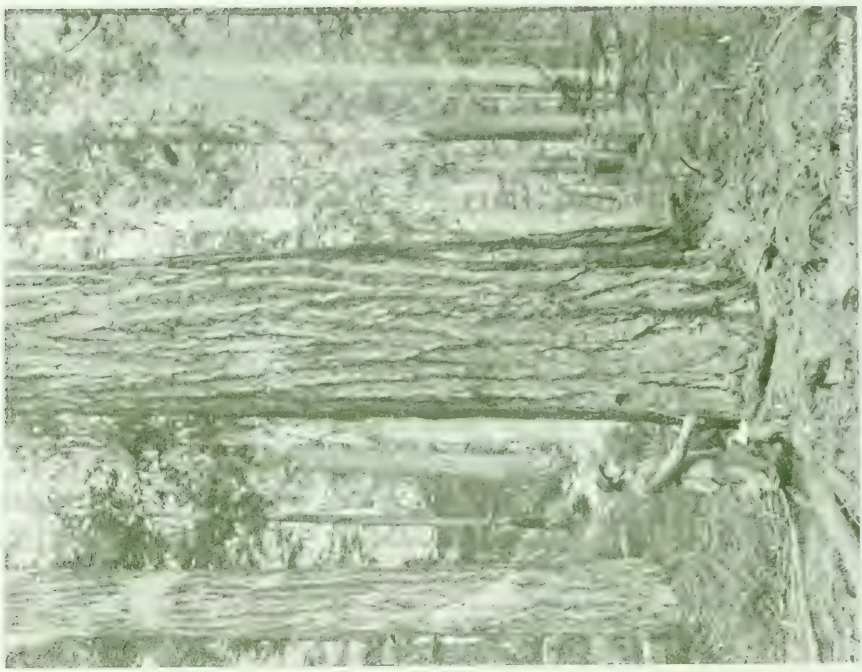
Canada's Plans for Aerial Patrol

Arrangements have now been satisfactorily completed between the Air Board and the Department of the Interior, and the necessary Government authority secured, for the operation of aircraft in Alberta and British Columbia for the purpose of aerial patrol against forest fires. Preparations are now being hurried forward and it is hoped that at a very early date aerodrome accommodation will be secured near Morley and a sufficient number of hangars erected to house six D.H. 9a aeroplanes and their requisite supplies. Owing to the fact that the season is already so far advanced it will not be possible to carry out a full program this year, but it is expected considerable experimental work will be done and that effective results will be secured toward the latter end of the summer. Operating from Morley the patrol has been arranged in a northerly direction just east of the Rocky Mountain Park as far north as Mountain House, where a sub station will eventually be established. From Morley the patrol will proceed in a southerly direction as far south as the Waterton Lakes Park. Communication will be maintained with the base by means of wireless telegraphy. The area outlined contains a sufficient number of open spaces to provide



An odd shade tree effect in Yarmouth, N.S.

emergency landing ground should a machine have engine trouble in the air. The D.H. 9a aeroplane is essentially a war product and while not altogether suited to the work in hand should provide the Air Board and the Department of the Interior with sufficient data with which to plan more extensive operations next year. Similar operations have been planned in British Columbia but since British Columbia is essentially a seaplane country a different type of machine will be used. The work of establishing a base at Vancouver has already commenced. The patrol in this instance will proceed in an easterly direction from the base, covering the Dominion Forest Belt as far north as Kamloops and in a north-easterly direction up the Straits of Georgia covering the westerly coast of British Columbia, in which locality there are some of the most valuable stands of timber in Canada. This area, of course, belongs to the Provincial Government in combination with which these operations are to be carried out. The machines to be used on this patrol will be the 504 K Type Avro on floats, 130 Clerget engine, H.S. 2L. Flying Boat, Liberty engine, and F. 3 Flying Boat, Rolls Royce engine. It is expected that in conjunction with the work of forest fire patrol other corelated work can be accomplished, such as hydrographic survey, photographic survey, fishery protection patrol, etc.



A Fine Sample of Douglas Fir, Fraser Valley, British Columbia.



Western White Pine, Fraser Valley, B.C.

Replanting France's Ruined Forests

The case for replanting the forests destroyed and felled during the war, and for the afforestation of other regions of France is forcibly stated by M. Paul Descombes in La Revue de Paris.



Photo—Courtesy W. N. Millar.
Sabot makers and hut in forest de Camora, France.

In peace times the forests of France only produced one-half of the timber employed in national industry. Among the lessons taught by the war has been the necessity for each nation to produce enough timber for its own consumption, and France is far from doing this.

In 1913 the timber consumed in France is calculated at just over 14 million cubic metres, of which there was produced in France, 6.7 million cubic metres; imported in the round, cut, and pulp, 7.4 million cubic metres; total, 14.1 million cubic metres. (1 cubic metre equals about 5 cubic feet.)

This shows that France already needed to double its production of timber; but authorities are of opinion that to replace the destructions of war and make up stocks will require in addition 6,000,000 cubic metres of timber during each of the five years following the war. There are thus two problems: (1) To double the permanent national production; (2) to procure an extra annual 6,000,000 cubic metres during five years. The first requires a permanent arrangement; the second may be partly met by obtaining timber as part of the indemnity payable by the enemy countries. Until that happens it is believed that the French Colonies can send timber, and more quickly. In order to do so it is necessary to restore the wholly devastated and the partly destroyed forests, and to afforest an increased area of land. A scheme published in 1907 in l'Economiste Francaise provided 4,000,000 hectares (about 10,000,000 acres), and included in the purchase of land, works of improvement, better management, annual subventions, and stopping the denudation of mountain surfaces, at a total cost of about £70,000,000 sterling. But this scheme would only have increased the forest area by half while double the



Photo—Courtesy W. H. Millar.
Dense balsam at 100 years of age in forest of Sevier, France.

production is required. On the other hand, by better cultivation a larger proportion of good timber can be secured and less firewood; and the use of trees of rapid growth is now prevalent. Hence it may be anticipated that the accomplishment of this scheme in 20 years would enable France to produce within three-quarters of a century all the timber necessary for its consumption. It is believed that the achievement of this programme in 20 years is quite realisable.



Photo—Courtesy W. N. Millar.
Old French forts on the Swiss border—Note the roadside trees on the slopes.



Photo—Courtesy W. N. Millar.

Where two roads in the French forest of Labergement meet.



Photo—Courtesy W. N. Millar.

Spruce plantation made to extend the forest of Labergement.

Let the Prairie Farmer Raise His Trees

The question is often asked by Journal readers: "If the Nursery Station at Indian Head is already producing trees for prairie planting fully up to its capacity, how is any new demand to be met? Can farmers grow their own trees from seed?"

Mr. Norman M. Ross, Chief of the Tree Planting Division, has the following to say regarding the farm nursery under prairie conditions:

"Where seeds of native trees can be obtained the cheapest method of getting seedlings is for the planter to grow them himself. Most of the hardy varieties are very easily raised from seed, the labour and expense in this connection on a farm amounting to very little.

Seed should always be procured, if possible, from mature trees growing under climatic and other conditions similar to those the seedlings will be expected to endure. The Manitoba maple has a very wide range, and seed might be procured almost anywhere in North America. It would be found, however, that that picked in the Southern States or even in Eastern Canada, would not produce seedlings hardy in the Prairie Provinces. The growing season is much longer in the East than in the West, and it has been found that seedlings from eastern seed do not ripen up or mature early enough to escape the fall frost on the prairies, and are consequently cut back. The greater the difference there is between conditions of growth affecting the parent trees and those experienced by the seedings, the greater the difficulties the latter have to contend with. This shows that many characteristics are acquired by the seed from the parent trees, so that it would always be wise to get seed from the best individuals and to avoid, where possible, taking it from dwarf or stunted trees. Seed from young trees does not generally have so good a germinating percentage as that borne by mature ones.

The amount of land a farmer would require for his nursery is very small; in fact, one-quarter to one-half an acre would be more than sufficient in the ordinary case. Any land that is in a suitable condition for growing garden crop and is at the same time moderately protected from the high winds, would do for this purpose. The best soil for the nursery is rich, sandy loam. It should be located near the house so that the work could be done in odd moments."

WHAT U.S. FACES.

(The Journal of Forestry)

The annual consumption of timber is one hundred thousand million superficial feet.

The present annual growth of timber is thirty-five thousand million superficial feet.

Eighty per cent. of the standing merchantable timber is privately owned, and ninety-seven per cent. of the annual cut comes from privately owned forests.

The national and state forests cannot meet the situation.

A timber shortage already exists in the United States and is rapidly becoming acute.

Prices will continue to increase.

THE COMMON STORY

New South Wales (Australia) once contained millions of acres of cypress forest in the Central division; but today the forests which have been left are chiefly either grass paddocks, or stocked mostly with small undersized trees up to 9 inches in diameter.

(Australian Forestry Journal)



A farm tree nursery, by which abundance of trees can be produced cheaply.

Some Big Timber of Antiquity

By Roland G. Kent, University of Pennsylvania

Many advertisements make a feature of the unusual size of the timbers which the firs may supply, or even picture the large size of the trees, standing or felled, from which they may satisfy the most extraordinary demands. In view of this, it may not be without interest to note what the ancient Romans had in the way of enormous logs.

In the year 301 A.D., the Emperor Diocletian issued an edict fixing maximum prices at which articles of trade might be sold; for then, as now, a period of wars and inflation of the currency had led to an appalling rise in prices; and the charge was made, even as it is today, that profiteers were taking undue advantage of the situation. Be that as it may, parts of copies of this edict, engraved on stone, have been found in some two score places in Greece, Asia Minor, and Egypt—the section of the Roman Empire which was under the special charge of Diocletian, and which alone, apparently, was subject to the price regulation. In the extant portions of the edict, over one thousand items of trade are listed, with their prices; wages also were regulated, not merely for skilled and unskilled labor, but for the learned professons, such as those of the law and of teaching.

Now to come to the point: In the twelfth schedule, which deals with building timbers, we find the following regulations, which we give here not merely translated into English, but with the units of weight and value expressed in the usual United States units:

Fir beam, 72 feet 9 inches long, 17.5 inches square$217.00
Fir beam, 65 feet 5 inches long, 17.5 inches square 173.60
Fir beam, 58 feet 2 inches long, 17.5 inches equare 130.20
Fir beam, 50 feet 11 inches long, 15.5 inches square 52.08
Fir beam, 40 feet 9 inches long, 17.5 inches square 42.40
Fir beam, 43 feet 8 inches long, 13.1 inches square 34.72
Fir beam, 40 feet 9 inches long, 11.6 inches square 26.04
Pine beams, at the same prices as for fir.
Oak beam, 20 feet 4 inches long, 12.4 inches square 1.09
Ash beam, 20 feet 4 inches long 8.8 inches square 1.09

The portion of the edict is broken off at this point, so that we know no other prices for lumber items. In comparing them with the prices of today, we should remember that these are maximum prices, and that the emperor expressly ordered dealers not to sell so high if they could sell at lower figures! Which did not work out in practice, for within four years Diocletian gave up the struggle and abdicated the imperial power, disgusted with the state of affairs. Just what happened we do not know, except for the vague news that the fixing of maximum prices resulted in much bloodshed and in hoarding of goods which produced a still greater scarcity and the edict was repealed at some date unknown.

But we should think of these prices rather in comparison with the wages of laborers; for the Emperor Diocletian tried to set maximum limits also for these. The highest wages were, for a shepherd, 9 cents a day; for a farm laborer, a camel driver, an ass driver, a mule driver, 11 cents; for a mason, a carpenter, a wagon smith, a ship builder working on ships for navigating rivers, 22 cents; for a ship builder working on ships to sail the open seas, 26 cents; for an inside house painter, 33 cents; for a painter of wall decorations, 65 cents. All of these were, however, provided with their meals; but a lawyer could not charge over $5.45 per case, no matter how long it lasted, and his meals were not provided while it went on, either!

The most astonishing thing is that such large timbers as those first on the list should have been sufficiently regular articles of commerce to be listed in the edict. The first item is 60 per cent. larger than the "big sticks sawed on a special order, 9½ inches by 24 inches by 62 feet," featured in a recent advertisement. Again, the question has been raised as to how they were used by the ancients; and a conjecture that they were used in ship building is confirmed by another advertisement which offers big timbers for this very purpose.

But these big sticks were far surpassed by others of which we hear in the Natural History of Pliny, the Roman statesman, scholar, admiral, and scientist, who lost his life while investigating the eruption of Mount Vesuvius in 79 A.D. In the twentieth book of this Natural History, which is really an encyclopaedia, Pliny tells us that the largest beam ever seen at Rome was one of larch, brought there as part of a consignment of lumber in the reign of the Emperor Tiberius, who ruled from 14 to 37 A.D. This particular beam was of such size, that instead of being used for construction, it was exhibited as a curiosity until some time in the reign of Nero (54-68 A. D.); it was 120 Roman feet in length (about 116 of our feet), and two Roman feet square throughout its length. This somewhat surpasses in length the 110-foot timbers advertised in magazines recently, the breadth and thickness of which are not stated. We hear elsewhere that larch logs were brought from the Rhaetian Alps, on the northern border of Italy; and we are left to wonder how a beam of such length and weight could have been transported by the ancients, devoid as they were of steam and electrical power, and even of wagons running on rails. Human and animal power alone were theirs, but they knew and used the windlass and the lifting crane. From



Fredericton, New Brunswick, the home of beautiful street trees.

the Alps this great log must have been slid and dragged to the Lake of Lugano, or to a neighboring lake, and thencepainstakingly through a narrow stream which is the outlet, to the Po River, where it could be loaded upon a ship of sufficient size to transport it. Perhaps it was later transferred to a larger vessel before the long and rough voyage down the Adriatic, around the end of Italy, and up the west coast to Ostia, at the mouth of the Tiber; from which it had still to be carried upstream the few remaining miles to Rome.

Another beam, one hundred Roman feet long and eighteen inches square, is mentioned by Pliny as having been brought to Rome in the time of the Emperor Augustus (who ruled 31 B. C. to 14 A. D.), by his minister Agrippa, for the construction of the building where the Romans cast their votes. It proved to be too large to use, and was still there, viewed as a curiosity, in Pliny's time, over half a century later.

Then there was the mast of the great ship which brought from Egypt the obelisk which the Emperor Caligula (37-41 A. D.) set up in the Circus on the Vatican Hill; this same obelisk, by the way, now stands in front of the great Basilica of St. Peter's, not far from the spot where it was first erected in Rome. But the ship that brought it was so large that it took up the greater part of one side of the harbor at Ostia, and the mast was so huge that it took four men with outstretched arms to girdle it. Such masts as these were said to cost 80,000 Roman sesterces, which would be over $4,000 in our money; and the general belief is, that money bought from ten to twenty times as much in those days as it does now. No! as it did fifteen years ago, which is quite another thing.

Tree Windbreaks as a Farm Asset

By Carlos G. Bates, U.S. Forest Service



Convincing Proof Gained From American Experiments How a Windbreak Adds Dollars to the Prairie Farm



When the prairie farms of the middle West were first developed, the lack of trees was felt severely. The clear sweep of the winds across the flat plains was a great hindrance to agriculture, for the soil was dried out quickly by evaporation, and grain was lodged and orchards injured by the mechanical force of the wind. Windbreaks were the only remedy, and thousands of miles of them were planted along roads and farm division lines. The effect of this planting, though only gradually felt, was very distinct; farming and living conditions became more favorable throughout the whole region.

Considerable planting is still being done, but probably no more than enough to counterbalance the cutting in windbreaks already planted. Of course the need of windbreaks is not so acute now as it has been in the past, but some extension of the planting in this region is desirable, at least enough to protect the new areas which have been put under cultivation.

Any body of trees which gives pro-



Effect of favorable atmospheric conditions on growth of corn plants and yield of fodder. On right, in protected zone (weight 81 pounds); on left in unprotected zone (weight 42 pounds).



A cure for prairie baldness: An inviting summer home near Winnipeg, amply shaded with trees and protected against prairie winds.

tection to buildings or crops may be called a windbreak. This article has to do, however, only with belts of trees planted about fields and farm buildings, especially for the purpose of breaking the force of the wind. The typical windbreak is a belt consisting of from six to eight rows of trees and usually from a quarter of a mile to a mile in length.

CHECKING WIND MOVEMENT

The influence of a timber windbreak upon air currents is purely mechanical. Its effectiveness depends, therefore, upon how nearly impenetrable it is. The ordinary windbreak does not provide an absolute barrier to the wind; a certain amount of air forces its way between the branches and foliage of the trees, so that the movement of the air on the leeward side is not completely stopped but only greatly reduced. When windbreaks composed of such trees as cottonwood become old, wide openings are left between the bare trunks and more wind gets through near the ground than higher up. Such windbreaks can be made efficient only by underplanting the cottonwood with other trees or shrubs.

An ideal windbreak for checking wind currents would have the contour of an earth dam. In the central rows would be planted the tallest trees, Such a windbreak would not be easily penetrated, and its inclined surface would divert the air currents upward and relieve the horizontal wind pressure.

Breaking the mechanical force of the wind benefits the farmer most directly by protecting his grain crops and his orchard. The value of the windbreak in giving this protection is, of course, difficult to measure in dollars and cents, but where winds are at all frequent such protection alone may be equal to the rental of the ground occupied by the trees. In one case in southern Minnesota a windbreak, 80 rods long and about 28 feet high along the side of a cornfield, afforded complete protection for a strip about 10 rods wide during a wind blowing at 50 miles an hour. On the unprotected part of the field the wind blew down half the corn and bent the remainder halfway, the damage beginning at the edge of the 10-rod strip and increasing until it was greatest in that part of the field farthest from the windbreak. The corn was in the milk stage at the time of the high wind and did not produce more than a third



Trees on the prairie make all the difference between a "house" and a "home." View taken at Indian Head, Sask.

of a crop on the damaged area. On the protected portion the total saving was 260 bushels, or the full crop of 6 acres, whereas the windbreak occupied only 2 acres.

Movement of the topsoil also may be checked and dust storms prevented by breaking the force of the wind. For this reason windbreaks are of immense benefit in sandy regions or regions where the soil is very fine.

Added to the crop and soil protection there is the personal comfort to be derived from protection from wind about the farm and home and along public roads. Futhermore, a protected home is heated in winter more readily, and hence more cheaply, than one exposed to the wind.

REDUCING EVAPORATION

There is no part of the United States, except small areas in the Appalachian and Cascade Mountains, which normally obtains more precipitation than is needed for growing the best crops. The farmer usually plows, cultivates, and mulches with the object of conserving every drop of water that may reach the soil during the year. In the "dry-farming" regions of the West these conservation measures are carried farthest. Here it may be necessary to save the moisture of two seasons to grow a single crop.

Anything which helps to conserve the moisture of the soil is of direct benefit to the farmer. The windbreak has this effect in a marked degree. The drying power of the wind is reduced by the windbreak very nearly in the same proportion as its velocity. In the immediate lee of the most effective windbreaks evaporation is reduced as much as 65 per cent. Farther from the trees the reduction is less. The amount of reduction depends not only upon the density and proximity of the windbreak, but upon whether the field is fallow or in crops. The saving in moisture is least when the field is fallow, so that the only reduction is in the direct evaporation from the soil; it is greatest when the field is in crops, so that there is a reduction not only in the direct evaporation from the soil but also in the evaporation from the leaves of the crops.

The more frequently winds occur in any locality during the growing season, and the greater their velocity and drying power, the more important it is to use every means of preventing evaporation. Windbreaks are especially valuable, therefore, in the Middle West, where hot, dry winds, often of high velocity, are of frequent occurrence during the summer months and in Montana and the Dakotas,

where the warm west winds of the winter and early spring, known as "chinooks," do great damage to winter wheat and orchards.

EFFECT ON TEMPERATURE

The farmer who has cultivated crops on a hot summer day need hardly be told that the warmest part of his field is the portion which is sheltered from the wind. In the lee of the windbreak there is not only no breeze to cool the body and reduce what is known as the "sensible temperature," but the actual temperature of the air is raised. Tests with a thermometer has shown that the area which is protected by a windbreak may be several degrees warmer during the day and several degrees cooler during the night than adjacent areas not protected.

Such crops as corn are benefited very greatly by warm, sultry days. The windbreak helps to create these conditions and offsets to some extent the effect of cold, cloudy weather. The cooling effect at night is of course unfavorable to growth then; but the night is a period of comparative rest, so that the nocturnal cooling off is far more than counterbalanced by the higher temperatures secured during the day.

WHAT ABOUT ORCHARDS

Windbreaks may appear undesirable for the protection of orchards in blossom or garden crops which are not hardy, because the danger of still frost seems increased by the stagnation of the air on the lee side. The added danger is more apparent than real, however, for still frosts only occur when there is practically no wind, and a windbreak can then have little effect one way or the other. Furthermore, complete stagnation of the air may be helpful rather than harmful if smudging is resorted to.

The freezing which often causes the most severe damage to orchards is



How much of Prince Edward Island's abundant agricultural prosperity is due to the protection afforded by belts of trees? No section of the Dominion enjoys a less interrupted prosperity, nor is the pastoral beauty of Prince Edward Island easily surpassed.

that which follows a cold rain or late snow. During such a freeze the damage to blossoms is greatly reduced by protection from wind; for evaporation which produces a rapid cooling increases in proportion to wind velocity. During a freeze of this kind in Nebraska in 1908, fully protected orchards yielded crops many times as heavy as those without exterior protection, and even the leeward side of individual trees exposed to the wind suffered much less damage than the windward side. It is noteworthy also that the one storm of rain and snow, with a temperature of 28 degrees, did all the damage during the season, and that later frosts with lower temperatures did not affect the orchards.

THE FORESTER IS BOTH SOWER AND REAPER

By Dr. B. E. Fernow, Dean Emeritus, Faculty of Forestry, University of Toronto

The forester is in the same business as the lumberman, namely to supply wood materials to the community. He is not after the beauty, but after the substance of the tree; he also uses the axe to harvest the crop, nay, he utilizes the forest even more closely than the lumberman, but in this utilization he introduces one new point of view, namely that of the economic use of the soil for future crops. He is not satisfied with the mere harvest of what nature had accumulated, leaving it to nature to do as it pleases in re-establishing the forest, but he feels himself obligated to provide systematically for a new and, if possible, better crop. Under his care the trees will also be cut and removed, but the forest will persist. He is the preserver of the forest, not in the manner in which the public is often made to believe, namely by preventing the use of the wood, but as all life is preserved, by removing the old and fostering the young growth. He is a sower as well as a reaper, a planter as well as a logger, and to him forestry is, with regard to wood crops, precisely what agriculture is, with regard to food crops.

CANADA'S GREATEST DAM

The Gouin (La Loutre) dam, on the upper waters of the St. Maurice river, Quebec, has a storage capacity of 160,000,000,000 cubic feet and a water area of 300 square miles, forming the second largest storage reservoir in the world. It is exceeded in size only by that of Gatun lake, on the Panama canal. The storage at Gouin will permit a regulated permanent flow of over 12,000 cubic feet per second at Shawinigan, rendering 1,000,000 horsepower now available on the St-Maurice.

CANADA'S PELT SALES

In the fiscal year, 1918-19, 12,723,000 pelts were imported into the United States from Canada. These imports included large numbers of rabbit skins from Australia and New Zealand and also about 250,000 sheep skins from Australia, New Zealand, India and Peru. These figures demonstrated that Canada is exporting more furs than ever before in her history, and that the number of fur-bearers taken in 1918-1919 was in excess of the annual increment, thus trenching upon our capital stock.

The demand for furs and the slaughter of fur-bearers necessary to meet this demand may be judged from the fact that at the London April fur auction sale 8,780,582 pelts were offered.



Through Cheakamous Canon, P.G.E. Railway, British Columbia.

Planting Trees for Permanent Fences

By E. J. Zavitz, Provincial Forester of Ontario

The question of securing fence posts at a reasonable rate and their short life after being placed in the ground is a problem confronting the agriculturist in Ontario. One solution of the problem may be found in planting trees along permanent fences. In a short time it will be possible to attach the wires to these trees.

The trees can be planted every sixteen feet or even every eight feet as the owner desires. Strong, vigorous plants should be chosen for such work and in the case of using evergreens, transplants should be used as the fence lines are frequently filled with dense grass and weeds which will endanger the young plant. More attention can be given the making of planting holes and the actual planting than in the case of waste land planting. Where a rail fence now exists and there is no chance to cultivate, the planting hole should be made by cutting away a large sod about two feet square. Occasionally it may be practical to cultivate a strip four to six feet wide along a fence which can be moved a few feet after the trees have grown. Preparation of this strip by summer fallowing will give results in future tree growth which will repay the effort. Whether planting is done in planting holes or on a prepared strip, future cultivation will give best results. This cultivation should be carried on for two years at least—longer will pay—until the trees have become well established. It will be an advantage to mulch the trees with grass or old manure. The trees should be inspected during the summer to see that weeds, etc., do not overshadow them. In case the owner does not want large trees along cultivated fields, the first planting can be done every sixteen feet and a few years later trees can be planted between. When the first trees become too large they can be cut off the height of a common fence post and later the fence can be attached to the younger generation of trees as the older ones decay.

The choice of species for this work must be given some consideration. The fastest growing species will be Box Elder, Hardy Catalpa, and Black Locust. In the southern portions of the Province and in the best classes of fresh, moist soils Hardy Catalpa may prove valuable for this purpose. Black Locust will grow on the poorest of locations and will be of more general value than Hardy Catalpa. Sugar Maple may be employed in this work, although the growth will be slower than the preceding species and it requires very good soil. Some may desire to plant nut producing trees so that a return may be had from nut crops. Black Walnut, Shagbark Hickory, and Chestnut would be the most valuable in this case. The Chestnut would grow on the lighter soils, while the Black Walnut should be planted in good, rich soil. If evergreens are desired, Norway Spruce, White Spruce, Larch and Arborvitae will will give best results. The Arborvitae should be placed in moist soil, while Larch will stand dry, poor locations.

Mistakes made in the selection of species of trees for highway planting, may not be discovered in a decade. In order to make such mistakes less common and to safeguard the public against errors in spacing of trees and selection of species for our highways, the following simple principles are offered:

1. Use only such trees as are comparatively free from destroying insects and diseases.

This will eliminate at once such trees as the black locust, the elm, the fruit tree, and any others which may have local enemies.

2. Use trees adapted naturally to the soil and climate of the locality. .

For example, a burr oak section should not have its highways planted with pine nor should a red pine section be planted to burr oaks.

3. Pure planting of one species should not be used for distances exceeding one mile.

4. Use trees that are native to the locality wherever possible. They give quick results and furnish variety.

5. Along roads that have been entirely denuded of tree growth, plant a temporary and a permanent tree alternately. An example would be: The sugar maple for permanent and the box elder for quick results and removal later when the sugar maple had attained useful size.

6. Space trees on the highway according to the spread of their crowns at maturity. Taking the sugar maple as an example with a spread of crown of 35 feet from the stem we see that a spacing of less than seventy feet will permit the interlacing of branches which is not desirable with highway trees; therefore, a safe spacing for sugar maple is 85 feet with trees on the opposite side of the highway to alternate. A planter may determine the safe highway planting distance for any species by measuring the crown spread of a fully mature specimen of that species and adding ten feet to the result.

FREEZING ROOTS OF TREES

(Saskatoon Star)

One can plant trees or shrubbery here with practically perfect assurance that they will live through the first winter, which is the time of danger, if proper care is taken of them. Many gardeners get the idea that if they can prevent the roots from freezing they are doing the proper thing, whereas it is perfectly natural for the roots of all the trees and shrubs to freeze up during the winter months, and does no harm whatever. The proper method is to let the roots freeze hard in the fall, waiting for good stiff winter weather to accomplish this. Once they are frozen, during the first winter they should be covered deep with any kind of covering that will prevent them from thawing out too early in the spring. If the snow is deep around them this will help, but in any case they should be covered over.

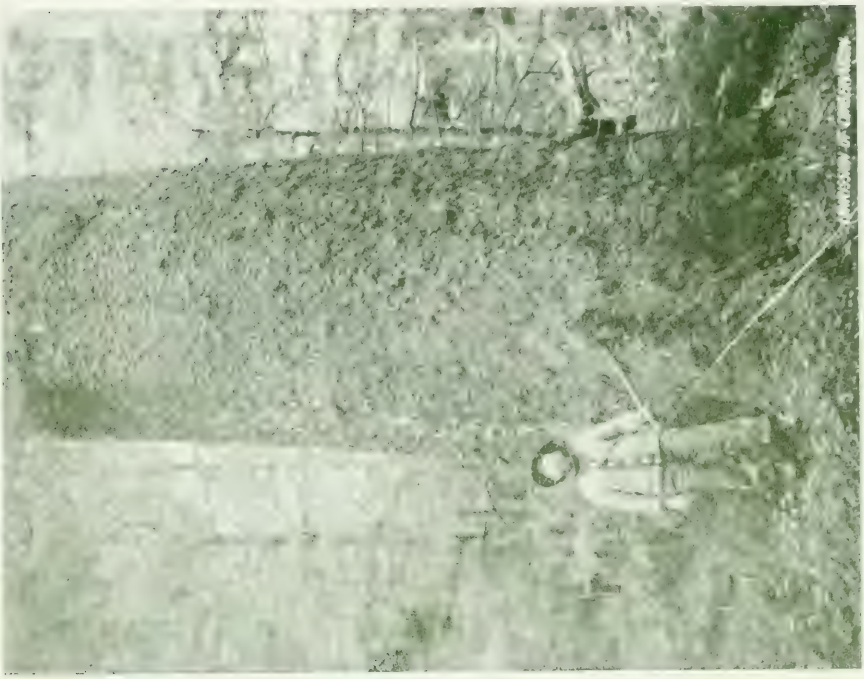
What does damage is alternate thawing and freezing in the spring, and it is the same thing with fall wheat. If the spring weather is consistently cold, and the break-up gradual, then the wheat will winter well. If, however, there is an early and complete thaw, and then later freezing weather again, fall wheat, or trees, shrubs and perennials, are likely to be "winter-killed." Consistently cold weather in the winter, with a slow break-up in the spring, is the best possible protection.

POCKETBOOK TESTIMONY

"In regard to forest conservation, the organization of public support is facilitated by the fact that the question directly affects the pocketbook of practically every member of the community.

"It affects every man who wants to build, buy or rent a house—or furnish a home. The rising cost of lumber has been a decided factor in retarding the building of houses to relieve the housing shortage that has contributed so largely to the dissatisfaction and unrest that are current today. It affects every man who buys a newspaper or periodical, a book for his library or textbooks for his children at school. It touches the pocket of every merchant, manufacturer or other business man who buys advertising space. It affects every man who has a dollar invested in forest industries and our total capital investments in these enterprises approaches the stupendous sum of $400,000,000. Finally, it affects every man employed in such industries of whom there are more than 80,000, with many additional thousands employed in woodworking establishments of one form or another that are directly dependent upon forest production.

"There isn't any question as to the motive behind forest conservation. It is a question purely of hard business sense—not of sentiment." (From an address by Mr. James White, assistant to the chairman of the Commission of Conservation).



The Tree That Makes Aeroplanes —**Sitka Spruce, at Naden Harbor,** British Columbia.



Mammoth Red Cedars, Fraser Valley, British Columbia.

Restocking the Woods of Rural England

By John Parkin, M.A., F.L.S.

The beauty of Rural England has suffered in no light manner through the wholesale felling of plantations, due to the exigencies of the war. Sylvan features, familiar and pleasing to several generations, have vanished. The old landed aristocracy and country squires loved their woods and well-timbered parks, regarding them more as amenities—game and sporting preserves—and the removal en bloc of fine stretches of woodland would have perturbed them greatly. Little did they who planted these woods imagine what value they would one day be to old England. The love of sport and the love of trees for their own sake have largely proved the salvation of the country with respect to its timber requirements. Governments in the past have ever neglected to take up practically the question of afforestation. It has been left in private hands—those of the much maligned landowners; and, however faulty their forestry may have been, if it had not been for their efforts, Great Britain would have been sorely tried to supply her needs. Experts, in fact, never thought these Islands could have furnished the quantity of timber required to keep going the mines and other essential industries for so long a period. The amount forthcoming from the plantations and covers—the smaller woods generally—was underestimated.

A WAR TIME GAIN.

Though our squirearchy in the past were, as a whole, great arboriculturists and tree-lovers, with few exceptions they could hardly be said to be sylviculturists in the modern sense. In fact, viewed from the economic standpoint, the clearing away in wholesae fashion of many of our woods was the best treatment that could be applied to them. Understocked, promiscuously mixed with trees often short and rough in bole, they would in pre-war times hardly have paid for the felling and haulage. Now, the ground being clear, there is the chance of their being planted on the most approved sylvicultural principles.

Whatever defects these woods may have had in the eyes of the trained forester, no one can deny that they were eminently picturesque and beautiful. The promiscuous mixture of species, the abhorred of the sylviculturist, lent charm and variety. Understocking allowed glades to arise and prevented a too severe repetition of boles of the same type. How different appears a wood grown on up-to-date forestry lines—a closely grouped mass of trees of the same kind and pattern with no relief to cheer the eye. Hence one is led to exclaim how often does the picturesque clash with the utilitarian, and how often does gain in usefulness entail loss in beauty! It would seem that some compromise is ever necessary to prevent our drifting into ugly efficiency and soul-killing monotony.

ENGLAND'S PARKS

Our woods, parks and hedgerows have made Rural England the admiration and the envy of the foreigner. How tame and uninteresting does the Continent appear in contrast. I am not thinking of scenery in the conventional sese; but of the plains the agricultural areas of the two when compared. Now the fear may be that in replanting our war-felled woods, we may go to the other extreme and sacrifice beauty wholly in the altar of utility. Beauty in our surroundings has doubtless a subtle effect on our general well-being. We know that to repair the ravages of war, production on sound economic lines is essential but in the strenuous times ahead, let us have some thought always for the beautiful in our reconstructing

schemes. In the towns our domestic architects in the past were responsible for much hideousness; in the country, on the other hand, our landowners achieved much beauty. In our endeavour to remedy the former, let us not reverse the latter by a too frequent repetition of woods of the same character.

To plant pure is a sound sylvicultural maxim. To follow this out to the letter will result in plantations of a severe type largely consisting of rectangular areas of a single species of conifer, as this class of tree gives the quickest return. With the exception of the larch, conifers are evergreen, and save for a brief period in late spring, when the new needles are put forth, they do not change their aspect during the course of the year. Woods, especially those situated on level ground, when composed wholly of pines or firs, present a sombre appearance and are apt to weary the eye. They require relief by the addition of deciduous trees, both to supply variety and to allow of the seasonal changes being manifested.

Planting Clumps for Protection of Stock

By E. J. Zavitz, Provincial Forester of Ontario

On stock and dairy farms clumps of trees afford valuable protection during the heat of the day. It is a common sight to see animals retreat to the shelter of trees which may happen to stand in the field. In permanent pastures and even in fields occasionally used for pasturage small clumps of trees could be planted in corners on waste portions of the field if any existed. It would be necessary to fence in such planting and give it protection till the trees reached a size of three or four inches in diameter.

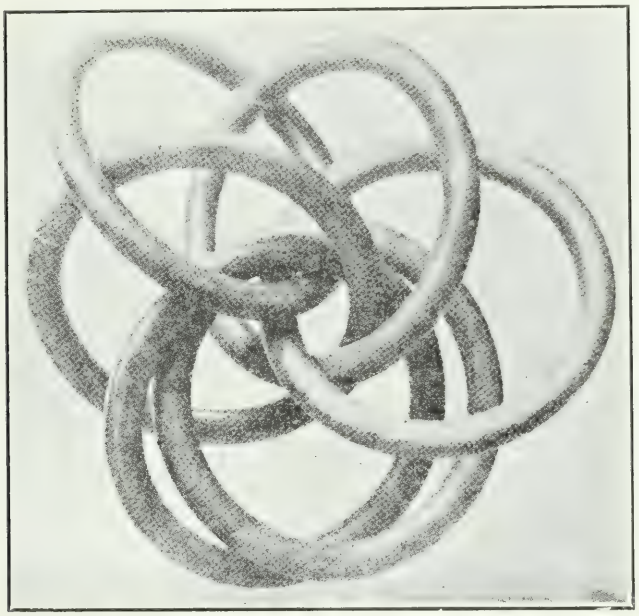
Deciduous trees, as Box Elder and White elm grow fast, develop plenty of shade, and stand the abuse to which they must be subjected by the animals.

Belts or rows of trees are frequently planted for protection to orchards, fields or buildings. There is no doubt about the advantage of such planting. stock in protected barns will need less feed. Protected houses will need less fuel. Orchard or field crops benefit by having protection. The drying winds of summer do less harm where tree protection exists. Orchards heavy with fruit are often protected so that loss from wind-falls and broken branches is lessened. Protected fields of clover, fall wheat, etc., hold the snow longer in the spring, which gives protection from frosts and loss of moisture by evaporation.

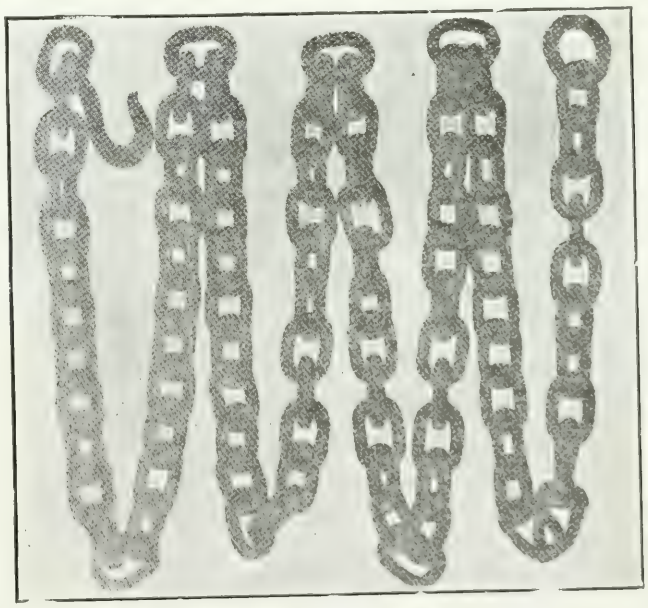
Throughout the Province of Ontario the prevailing winds are westerly, which should be taken into consideration in planting shelter belts.. Any delay in the adoption of the scheme prolongs the period of the timber shortage and the losses arising therefrom.

LIMITS, BELGIUM'S SIZE.

Probably the greatest amalgamation of timber and paper companies in Canadian history took place recently by which the Riordon Pulp and Paper Co., Montreal, took over the holdings of Gilmour and Hughson, and W. C. Edwards & Co., linking them to the extensive Riordon properties known as Kipawa Company and the Ticonderoga Pulp and Paper Company. The combined timber limits are 12,000 square miles, an area larger than Belgium, and contain 25 million cords of pulpwood, nearly one and a quarter billion feet of standing pine, 150,000 horsepower of water-power. The most valuable holdings of white pine in the world are said to be within the borders of this unified forest empire, the pulp and paper output of which will be about 150,000 tons per annum.



A masterpiece of six interlocking rings carved out of a single piece of wood.



A whittled chain about six feet long, carved out of one wood block

Some Remarkable Whittling

In "A Whittler's Reminiscences," printed in The Guide to Nature, A. T. Cook, of Hyde Park, N.Y., relates some of the events that led up to the production of the remarkable bits of wood carving illustrated herewith — remarkable not as works of art, but for their difficulty and intricacy. Mr. Cook believes that a boy might better spend his time on whittling of this

sort than on much that is taught in the schools. The mere ability to make and mend is profitable through life, he asserts. Writes Mr. Cook:

"As far back as I can remember I was always a whittler. At four years of age, three years before I went to school, I had a pocket-knife all my own, and well do I remember my joy in whittling things from pine blocks and dyeing them in the bright colors of the dye my mother used for carpet rags. To my young mind it was a wonder that anything could be made so exquisitely beautiful. A year before this I secured a table-knife and in cutting with it slashed my left forefinger dreadfully. This was seventy years ago, but it seems almost as yesterday that my dear mother bound it up and relieved the pain with kisses, as only a mother can. I carry the scar to this day.

"As time went on I whittled out better things, a multitude of them. Indeed I often whittled until my knife made my hand so sore I was compelled to stop, and then I wept because I could not whittle more. I whittled things curious, ornamental and useful. I made and sold many kites at the fabulous price of two cents each, and for some of the larger and finer ones I was actually paid three cents each. I saved the money too, spending very little for gewgaws and never a cent for tobacco or intoxicants, a practise that has continued through my life and been a source of constant satisfaction and joy to me.

"It would take pages to tell all I whittled when a boy. There were water-wheels and wonderful windmills that showed men churning, sawing wood, etc., as well as puzzle blocks, joker mills, secret self-locking boxes, fancy fans and captive balls. One of my early hobbies was self-setting mouse-traps. I designed a half-dozen or more original patterns. Each mouse on entering set the trap for the next one. To my unbounded delight most of the traps fulfilled the purpose for which they were made.

"Then followed the chain shown in the illustration. It is of butternut-wood, about six feet in length and contains ninety-five links, including ring hook and swivel. I timed the making and it took just sixty-three hours, most of the work being done in the evening while my good father read for the family.

"About this time I found there was a demand among my neighbors and friends for some of my products, and I was only too glad to sell them, for money was a pretty scarce article in those days. Picture-frames, knife-boxes, nail-boxes, boot-jacks, axe-handles, rat traps, mouse traps, clothes horses, and the like, brought me much needed money and the encouragement to make larger things. I made and sold a great number of writing desks, bureaus, washstands, office tables, secretary bookcases and type cabinets — things that counted, for some of them sold for as much as sixty dollars, a big sum at that time. A sixty-dollar sale, however, brought me no more joy than the sale of a two cent kite in the early days.

"But with the whittling I was always just crazy over gardening, and somehow I got to growing and selling garden seeds, and the ever-increasing demand for these was perfectly astonishing, so much so as to occupy all my time. For forty years I did but little whittling. . . .

"Somewhat recently I thought I would see if in the forty years' interruption I had forgotten how to whittle, so I cut out the six interlocked rings shown in the illustration herewith. These rings, cut from a solid chunk of wood, are, I think, the most complex and difficult piece of work I have ever done. Each ring goes through all the rest. If any think them easy to make, let them try it. It was a queer piece of wood just before the rings were separated. . . .

"My experience proves that whittling is useful, profitable, and of far more value through life than much that is taught in the schools. The ability to make and mend things is most desirable and saves time, vexation and money. Encourage children

to whittle. It will benefit them in many ways. Never mind if they sometimes cut their fingers. They will get well again. Don't buy them many toys. It will be much better to let them whittle them out."

ABITIBI CO'S. FORESTRY WORK FORGES AHEAD

Iroquois Falls, Ont.:—Since its establishment last summer the Forestry Department personnel has been hard at work along a number of different lines and considerable progress has been made in work accomplished to date.

The experimental Valuation Survey or Reconnaissance begun last fall has been brought to completion and as a direct result that method of survey most practicable and economical, under the given local conditions, has been determined and will be followed in the Reconnaissance of our Limit.

A detailed Base Map of our Holdings is at present in the course of compilation. The detail shown thereon will be increased from time to time as additional information is secured by crews in the field.

The intensive Regeneration Survey, carried on jointly with the Commission of Conservation, has been completed and much detailed information regarding the regenerative capacity of the Limit has been made available. This information is fundamental and essential to the development of an economic system of reforestation and will likewise aid in the development of such practices as will assist in sustaining the yield of those species of timber most valuable to the industry.

Detailed Growth Studies to determine the rates of growth of the various species have been carried on over average areas on the Limit and Rate of Growth Tables and Volume Tables have been compiled from the measurements and studies made. The former of these two tables will be used in connection with Reforestation work and the latter in the compilation of the Timber estimates which will be a part of the Reconnaissance.

Field Investigations have been made, the object of which have been to determine possible ways and means for increasing our yield through a closer utilization of the trees cut and so further the conservation of our timber resources.

The season's work on the Nursery at Twin Falls has already commenced. The Nursery, initial ground for which was cleared last summer, will be placed on a producing basis during the coming summer months. Seed will be sown this year in quantities to yield ultimately over 2,000,000 trees. Increased quantities of seed will be sown annually hereafter until the Nursery has been placed upon the required productions basis.

The early part of May will see the Reconnaissance or Valuation Survey of the Limit well under way, and with its inception will be begun, the building up of what may well be called a "perpetual inventory." The securing of this information is essential, in order that the Department may be enabled to render the most material results.

Three crews of four men each will be placed in the field on this work. The crews will first survey those areas which the Woods Department intends to log in the immediate future and the information secured will be placed at the disposal of the Woods Department to be used by them by way of facilitating their work in the economic location of camps, letting of contracts

A considerable amount of exploration work will be carried on toward the end of the summer and next fall, when it is tentatively planned to place two exploring crews in the field.

During the coming open season, it is planned to carry on jointly with both the Commission of Conservation and the Entomological Branch of the Department of Agriculture, field work, along investigative lines.



ON LAKE OF BAYS, ONTARIO.

EUROPE'S EYES ARE ON CANADA'S FORESTS

(An interview with Sir Lomer Gouin, Premier of Quebec)

"While in France and Belgium I conversed with many distinguished capitalists whose eyes are focused on Canada. Many of them expressed the intention of investing in Canada, and in the province of Quebec, and I expect to see a large influx of technical men in the near future to explore our mineral resources, and later a flow of immigration from France, Belgium and England.

"What is today causing the greatest interest in Europe is our wealth of forests. The demand for paper has become so great in France, Belgium and England that capitalists are now turning their attention to Canada for a supply. I had to answer many inquiries on this question from capitalists who wanted to know where they could secure limits, and there are several syndicates with large capital, both in France and England, who are coming out to this province to acquire forest lands.

"I do not think," added Sir Lomer, "that it would be wise for the present to give publicity to the names of these capitalists."

"In England," continued the Premier,, "I found capitalists as keen to invest in the resources of this country as were those of France and Belgium. In England there seems to be a perfect craze to come to this province for the wood that will prevent a paper famine."



The Canadian Forestry Association's Tree Planting Car, now journeying to scores of communities in the Southern prairie provinces. The interior is equipped as a motion picture auditorium with accommodation for over 100 people. Special electrical generators are carried to make the car independent of local current.

Two public meetings are held daily, and the public response, particularly of Western farmers, has been highly gratifying. The motion picture films tell a complete story of the benefits of tree belts under prairie conditions.

DOES ORGANIZATION PAY?

(*An excerpt from a letter to the Canadian Forestry Association by Mr. Angus McLean, Vice-President of the Bathurst Lumber Co., Bathurst, N.B.*)

"There is one thing we are pleased about, and that is the way in which the general public are interesting themselves in the extinguishing of these fires and also the work of the fire fighting appliances which have been used very effectively. If it were not for the organizations that have been built up to fight this fire fiend, the loses we would be suffering at the present time would be untold."

"Protect, increase, restore,
"Maintain productive timberland
"And bring content on every hand
"Now and forevermore."

Motto of Empire State Forest Products Association.



MR. ARCHIBALD MITCHELL,

well known throughout the prairie provinces as a tree-planting exper' of 30 years experience; and a favourite lecturer.

A Matter of Jobs

All forest fires are job-killers.

We Canadians let loose about 7,000 incipient forest fires every spring, summer and fall—7,000 volunter job-killers. It isn't the trees that matter,. but the JOBS that are tied to trees.

Undermine the Canadian Forest with Fire, and you automatically destroy a gigantic paper and pulp and lumber business with 425 million dollars and an army-corps of workmen depending on the forest's safety.

"What's my part in this?"

Just a simple thing or two:

Next time you are in the woods, build your camp fire in a safe spot; build it small; then put it out. .Put it Dead Out.

Watch every atom of fire—matches and cigarettes especially—as you would in a gunpowder factory.

Nearly all terrible forest fires began inside a square inch.

CANADIAN FORESTRY ASSOCIATION

The above represents one of a series of forest protection talks which appear on the menu cards in all the dining cars of the Canadian Pacific and Canadian National railway systems. Cards bearing the "sermonette"are clipped to the menus and are frequently replaced by new text and illustrations. The Canadian Forestry Association values highly this substantial favor on the part of the two great systems. Mr. W. A. Cooper is Manager of the Sleeping and Dining Car Department of the C.P.R., and Mr. Walter Pratt is the responsible officer of the Canadian National system.

FORESTS OF WEST AFRICA CONTAIN 500 SPECIES

There are, on the west coast of Africa, from Liberia to the Congo, to a depth of from 50 to 300 kilometers, forests second only to those of the United States and perhaps Brazil, which are destined to supply Europe for a long period. Several firms familiar with the qualities of the timber, have in former years made attempts to market and introduce these woods. It was not until after the quality and comparative cheapness of these species were recognized that this trade commenced to grow, assisted by the improvement in woodworking tools and machinery.

Just before the war Hamburg was the most important market for West African timber. J. F. Mueller & Son, Hamburg brokers, took part in the development of this industry. The trade increased in a few years and became an economic factor. It is estimated that about 500 different species of wood grow in the West African timber belt, but only an insignificant portion has so far found its way to market.

Much of this region is not yet sufficiently accessible and has not been investigated, and the difficulties of cutting and transporting the timber to the coast are many. In some regions the logs are cut and squared before they are brought out. Logs are rolled by native labor to the waterways. In the rainy season sudden rises in the watercourses are taken advantage of to raft the timber to the coast. In the rainy season workmen watch day and night for the opportune time to raft the logs down stream, for if an opportunity is allowed to pass, the logs sometimes lay over for a whole season.

In 1913, 115,000 tons of okume and 30,000 tons of mahogany were imported into Germany. The war brought a complete stop to this enterprise.

Is the Forest Safe for Trees?

By Dr. C. D. Howe

Now let us turn to the cut-over lands which have not been burned since the logging operations. Surely these are safe places for trees because they have escaped destruction by fire. However, let us inquire into the situation, using as a basis the results of an investigation being carried on by the Commission of Conservation on cut-over pulpwood lands in the River Rouge and St. Maurice Valley in Quebec. The original forest in the St. Maurcie Valley was dominated by white pine, scattering giant trees from three to six feet in diameter and from 100 to 500 feet high, towering 50 to 75 feet above the associated birch, maple, spruce and balsam. The region was first lumbered for pine between 60 and 70 years ago, and the lumbering was continued down to 35 years ago. Judging from the stumps still left, the number of trees ran from 5 to 30 per acre.

A Riddance of Pines.

Today one sees only an odd pine in that region, on bluffs and ridges inaccessible to the logger; and this is a region that has yielded enormous quantities of pine logs. The trees have gone from the forest, and, more important still, they have left no young behind them to take their places. I mean, under the general forest cover. There are scattered young trees along the lake shores, in old logging roads, and in other open places, but in the deep forest I could count all the young pines I saw in two summers' work on the fingers of my two hands, and yet old pine stumps are everywhere. The forest has been treated in such a manner that the white pine has been crowded out. In order to prosper, it demands plenty of overhead light. The openings in the forest made by the removal of the pine filled in with hardwoods; by overshading, the latter stifled the light-needing young pine trees before they could get a real start in life. This region has been a very unsafe place for the second generation of the pine. We do not know yet how general this condition is. We hope to know some time, as our investigations progress, but, if this condition does extend throughout the unburned old pine lands in eastern Canada, the position of the white pine becomes serious. I have already demonstrated what is happening to white pine burned. If we put its position on these two classes of areas together, that is, on the burned and unburned lands, it will be seen that the maintenance of the white pine in our forests is, indeed, at a very critical point.

What Examination Shows.

During the past two summers the Commission's investigators of the condition of affairs on the cut-over lands have actually counted the small spruce and balsam trees on 300 acres. By the strip method a timber cruise usually covers five per cent. of the area. On this basis, our forest regeneration survey, conducted in practically the same manner as a timber cruise, represents a five per cent. cruise of 6,000 acres, or about nine square miles of cut-over lands. These areas were, as a rule cut twice in the earlier days of lumbering for spruce saw logs, sometimes three times cut over twice, and some of them three times, for pulpwood. Let us now turn to these cut-over lands and see if they are to remain continuously productive in terms of spruce saw logs, or, following more closely my theme, to find if, under the present logging methods, the forest is a safe place for spruce trees.

Areas Severely Culled

(Based in sample plots totalling 97 acres).

Spruce trees removed, per acre	26
Present number of spruce trees per acre:	
Seedlings (below 0.6 in. diameter at breast height)	422.0
0.6-3 inches diameter at breast height ,inclusive	27.9
4-7 inches diameter at breast height, inclusive	19.6
8-11 inches diameter at breast height, inclusive	7.4
Total	476.9

Our Eastern Car Now Woking in Gaspe

The Canadian Forestry Association's Railway Exhibition Car (No 1), freshly equipped from end to end, and carrying its own electric generating plant, is meeting with a remarkable welcome in Eastern Quebec, south of the St. Lawrence, along the lines of the Canada and Gulf Terminal Railway and the Quebec Oriental Railway. Hearty co-operation has been given by the Southern St. Law rence Forest Protective Association, by the various municipal authorities, parish priests, lumber companies and fire rangers. A French demonstrator and lecturer attends to the crowds during the day and lectures in local halls, at night, with the aid of motion pictures, for which the portable generator supplies electrical current.

This year the Forest Protection Car, loaned by the Canadian National Railways, was in the hands of carpenters and other workmen for several weeks in order to construct inside the car an attractive and instructive set of exhibits. Seventy electric lights, arranged in handsome plate-glass show cases and behind frames of hand-colored scenic "transparencies" contribute to a pleasing effect. The products of the forest are so arranged that most of the manufactures of pulp and many uncommon products of hardwoods are arranged and described so that any French or English visitor can grasp the argument for forest conservation. Models of look-out towers, forest telephones, wireless telegraph, etc., form one interesting section. A small tree nursery and a graphic model of a maple sugar bush readily attract attention. A rotating "automatic steropticon" keeps fifty lantern slides flashing on a stationary screen. On every hand, framed notices press home the argument for forest preservation. "Forest fire movies" used during the evening lectures have been found very valuable educationally.

The car will move from Gaspe into Northern New Brunswick, working through town after town of the districts presenting greatest scope for educational propaganda, then into Central Quebec for some weeks, afterwards devoting two months to Ontario.

The management of the Canadian National, Canadian Pacific, Temiskaming and Northern Ontario, Quebec Oriental, and Canada and Gulf Terminal railways have extended to the Forestry Association's enterprises the maximum of courtesy and co-operation.

FROM NEW BRUNSWIICK.

Newcastle, N.B., May 11, 1920.

"Canadian Forestry Assoc.

"We feel your association is doing valuable work throughout Canada towards conservation and protection of our forests, and we trust you will continue the good work. The Forestry Journal is a very nice publication, and contains valuable information from time to time, We look forward each month to receiving our copy.

"D. & J. RITCHIE & CO."

Municipal Council to Cover 1000 Acres of Sand With Trees

By "Ahmik," Agricultural Contributor, Toronto Globe.

The County Council of Simcoe has arranged to buy 1,000 acres of sand plains in the district north of Barrie for purposes of reforestation. This is merely a beginning. It is the intention to add to the area to be planted from time to time. It is understood that the Provincial Government will supply seedlings for planting and do the work of planting free of cost. The work of caring for the seedlings, after planting, will also be undertaken by the province, but the cost of this will be charged against the county. When the trees mature these, as well as the land, will be the property of the county.

This is the most practical method by which a policy of reforestation in older Ontario can be carried out. It is a co-operative method; it unites the interest of two public bodies, one local and the other general, for common benefit.

The site selected for the beginning of what should be a great province-wide development is, too, admirably chosen. The soil is a sandy waste, wholly unsuited for agricultural purposes, but admirably adapted for the growing of pine. In fact, it was once covered with pine.

But the sand plains north of Barrie do not furnish the only location where such work as is proposed in Simcoe county can be advantageously carried out. In a recent trip through Durham county, in connection with the Scriven memorial service, Premier Drury saw a somewhat similar location in the sandy ridges paralleling Lake Ontario. In addresses at Milbrook and Omemee, the Premier suggested the application to this section of the policy being applied in his own county of Simcoe.

To Simcoe will go the honor of being the pioneer in actual work of reforesting the waste lands of the province. It will be no small honor if Durham takes second place in the line. And the Farmers' Government of Ontario could leave no more fitting and lasting memorial of its term in office than a number of Provincial-county forests scattered all over the Province.

To the whole Province, as an almost immediate effect of such work, would come benefits in the form of effect on climatic conditions and water supply. To Province and counties would come eventual profits from the timber created. A three-quarter-acre block of second growth pine, seventy years old, in Simcoe county, recently sold at a price that represented an annual rental during the period of growth of $7 per acre—more than the rental value of good agricultural land. And that is only part of it. Such forest plantations as proposed may in time be made the means of forming the centres of industries that will afford a good livelihood where a proper living cannot be made by attempts at using sand plains or sand hills for agricultural purposes.

The ball is off. Keep it moving.

SASKATOON TO THE FORE!

This season has already seen an unprecedented demand on the part of the citizens of Saskatoon, for shrubbery and small trees for planting purposes, states the city gardener. Plans are under way in the city to cope with the greatly increased demand, and this year there will be more than 200,000 trees and shrubs planted at the city greenery.

Cuttings which are planted this year consist of poplar, honeysuckle, lilacs and willows, and judging from results on a small scale in the past, this will soon grow to a matter of primary interest in Saskatoon, where the love of beautiful homes has grown rapidly during the past year or two.

In addition to this the parks board has purchased large quantities of elm trees and caranganas. These will be cultivated with special care, as well as distributed to the citizens who wish to purchase. They are being handled at the cost price, the aim of the board being to clear expenses and beautify the city at all events.

What the Boys Can Do!

(A graphic letter from a member of our Speakers' Bureau.)

Perth, N.B., June 7th, 1920.

Secretary, Canadian Forestry Association:

In accordance with arrangement I have been able to conduct one meeting in the Perth School. As you no doubt are aware, fires have been raging through this Province for more



THEY'LL DECIDE OUR FOREST POLICIES IN A FEW YEARS.

Five boys who fought forest fires near Perth, New Brunswick, for 48 hours without quitting. Read Mr. Manly Craig's letter printed herewith.

From left to right (standing): Harry Sisson, age 13; Wilfred Pelton, age 12; Harold Grant, age 12; (sitting, left to right) Vernon Dickison, age 15; Albert Lewis, age 9, all members of Ando-Perth Cadets.

than two weeks beginning about the 10th of May, and we, in this section have been among the "hard hit," the whole population having suffered more or less as a result of the great forest fires, and which we have been fighting with determined effort, but by reason of the tinder like condition of the slashings were unable to make much headway in beating back the enemy.

Out of the 350,000 people in this Province, there were a few, just a few individuals, who, through carelessness, have caused a destruction of nearly $2,000,000.00. There is, too, every reason to believe that a few persons have stooped low enough to touch a match to our forests. It does seem to be like a drop in a bucket towards the total eradication of this evil, when it is realized that perhaps less than a dozen persons out of the whole population are able to so place themselves on the side of the most destructive enemy-fire.

$30,000 worth of valuable timber and lands have been destroyed here at Perth, and some one person is guilty, for the fire which appears to have been set by a culprit (though not yet apprehended) has covered an area of 8,000 acres.

I had the pleasure of talking to about fifty of the boys and girls in the Perth School on Friday, May 28th, and must say that I never met a more appreciative audience. They seemed to drink down every word, for most of them had just passed through the fire fighting experience in the forests here, and were eager listeners for anything touching upon this subject. I am sure that not one of these boys and girls will ever forget the meeting. In conversation with some of the parents after the lecture, I was informed that the children carried news to them which they had never before heard of. One of the boys, age ten years told his father the whole story, and one of the things he became most interested in was the age of a tree and how to find it. Others were more interested in the great destructive fires of

A Striking Bargain in Nature Books

The Canadian Forestry Journal will clear out its remaining edition of three notable

NATURE BOOKS

at prices impossible to find in the bookstores. Write in at once, enclosing money order, as the number of books is very limited.

"The Tree Guide," by J. E. Rogers, a noted authority, with 265 illustrations, 32 of them in natural colors. This book has had a wide international sale. It is made in a handy size for the pocket, with leatherette covers, gold stamping, fine paper, and the price is $1.00, post free.

"The Animal Guide," by Chas. K. Reed, an authoritative and entertaining writer. The size is identical with "The Tree Guide," and it contains 60 colored illustrations. The covers are fibre, and every page and picture is made interesting. The subject matter covers the wild animals of North America. Price, 70 cents, post free.

"Game Birds," a well-known book of 65 pages, with pictures on every page in quadri-color. The descriptions are non-technical, and no finer illustrations have appeared anywhere. Price, 40 cents, post free.

The three books, while they last, will be mailed to any address, post free, for $1.75.

Address your order to-day to

CANADIAN FORESTRY JOURNAL
JACKSON BUILDING, OTTAWA· CAN.

Mention the Forestry Journal for your identification.



THE FIRE RANGER'S TOWER——

The Natural Location for a
MARCONI WIRELESS TELEGRAPH
Or Wireless Telephone Outfit.

Wire systems are easily put out of commission by falling trees.

A fire sweeps over your limits and down go your wires—Just when you need them most!

Avoid Risk—Invest in a Modern Communication System.

Wireless Telegraphs and Telephones
Manufactured, Installed and Operated by

THE MARCONI WIRELESS TELEGRAPH COMPANY.
OF CANADA, LIMITED.
11 ST. SACRAMENT STREET
Montreal.

Vancouver
Winnipeg
Toronto

Halifax.
St. John's
Nfld.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.

Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.

We have assisted in the initial financing and distribution to investors of the following securities which will be quoted on request:

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.

Howard Smith Paper Mills, 8% Pfd. and Participating Stock.

Riordon Pulp & Paper Co., Common (10%) Stock.

Mattagami Pulp & Paper Co., 7% Convertible Debentures.

Wayagamack Pulp & Paper Co., First Mortgage 6% Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

Mention the Forestry Journal for your identification.

the past, and as I had personal experience through the great Hinkley fire of Minnesota, was able to picture to them some of the devastating scenes caused by Forest fires.

At the close of the lecture which occupied twenty-five minutes, I asked all to stand who would pledge themselves to enter now into battle against the great enemy, and every one in the room answered to the call. This, in my opinion, is the only successful method of combatting the forest fires in our Canada. These boys and girls will, in just a few more years assume the responsibilities we are now assuming, but if they are enlisted now, they will be able to perform their services to our country better than we have ever done. The world conditions, and the warning given by Sir Auckland Geddes to the graduating class at the George Washington University on May 31 is worthy of consideration, for the very high ideals of civilization depend upon the three essentials which he mentioned to be kept in view: "**Duty, Service and Truth.**" And so I believe that now is the time to plant in the minds of the boys and girls of Canada, these three great essentials for the protection of civilization. I am herewith handing you a photograph of five of the boys who fought fire for forty-eight hours here at Perth a few days ago. These boys deserve special mention, and I am going to see that the Country will know of them; they will soon be men, and I feel sure that these five can be depended upon to fight forest fires or any other kind of a fire, or any kind of a battle for the protection of civilization and our country.

Sincerely yours,
MANLY H. CRAIG.



MR. G. GERALD BLYTH,

Recently appointed Assistant Secretary of the Canadian Forestry Association. Mr. Blyth saw much active service with the British naval forces during nearly the whole of the war. Recently he has occupied the post of Supervisor of Timber and Fire Protection in the Dominion Parks Branch, Ottawa.

DYNAMITE IN BUSH FIRE

Elk Lake, Ont., becoming panicky, when their boat encountered a bush fire at a portage, because there were twenty cases of dynamite aboard, employes of the Thesaurus Gold Mines abandoned their craft and the entire provision supplies of the mine, machinery and gasoline boat were destroyed. Though the bush fire exploded the dynamite, a ton in all, not a soul was injured.

The fire, which destroyed a large area, started north of Matchewan Gold Mines and traveled to the lake in three hours. It frightened the Indians, who assisted the Hudson Bay factor to bury the fur in stock and the whole lot fled down the river to Elk Lake. It turned out that the post escaped and the fire died out when the wind changed.

BIG FARMS TO BE FIRE CLEARED

(Prince Albert Herald)

C. McFayden, inspector of forest reserves, last week visited the Porcupine area, where preparations are well advanced for the clearing by fire of two large areas. Fire guards have

been made around one area northeast of the Copeau river, about half a township in extent, and one bordering McDonald creek about a township in extent. Surveyor Christie is superintending the work of the Copeau River area and Surveyor Cummings the other. It is expected that the big fires will be started in about a week.

As to the Porcupine for a place of settlement. Mr. McFayden states that he was surprised to find how much better the soil was than he had been led to expect. The rich black loam is ideal for farming, and he believes that settlement will be rapid. New soldier settlers are already going in to locate or to take up land already allotted to them.

HOSIERY FROM WOOD

In 1914 American manufacturers produced 300,000 pounds of artificial silk made from cellulose, largely wood cellulose. The production in 1918 was approximately 13,000,000 pounds. Importations of artificial silk in 1914 were over $4,000,000 and are now only about one-fourth of that sum. It is now being used to advantage in fabric mixtures with natural silk and wool, but its chief market is in the form of hosiery.



Mention the Forestry Journal for your identification.

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks
Montreal."

MONTREAL, QUE.

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Journal for your identification.

Winning the Children by Our Speakers' Bureau

Hillsborough, N. B.

"I delivered the first address and am now arranging to take in as many of the other schools as possible. I consider the first manuscript excellent and difficult to improve upon."

C. J. OSMAN.

Cobalt, Ont.

"I should be pleased, indeed, to receive your second lecture on Forestry at your earliest convenience. The pupils and teachers were delighted with your first lecture."

A. E. BRYSON, Principal,
Cobalt Public School.

Matheson, Ont.

"We have been at the school this morning and made arrangements with the principal for Mr. Barlow to address the pupils from time to time. Mr. Barlow will give his first address on May 25th.

D. CHALMERS.
Magnetawan, Ont.

"According to arrangements, I addressed the senior classes of the public school here on May 20th. The teacher was quite interested and the pupils were attentive."

ANGUS ROSS.
Marmora, Ont.

"On May 21st, I delivered the address which you sent me to the senior pupils of the Public School here. The pupils gave a very attentive hearing and the principal expressed his warm approval of the lecture.

"I feel sure you are doing a splendid work in reaching the young people in this way."

F. S. PEARCE.

The foregoing are typical of the hearty reception accorded by the schools of Canada to the Canadian Forestry Association's most recent enterprise, the Speakers' Bureau. In this work, several hundred public spirited Canadians have volunteered to do a vital service to forest conservation by acting as local speakers. The appreciation of all members of the Canadian Forestry Association is due those who have not hesitated to tax their time and energy to cultivate a more intelligent concern for the nation's forests.

Any member of the Association who has an opportunity to make use of a lecture manuscript is invited to send in his name. Every town and village in the Dominion should have the benefit of these entertaining juvenile lectures.

"This work is vital to our national welfare and should be extended," writes a school principal, Mr. F. T. Fowler, in Seaforth, Ont.

"I shall appear before the County Grammar School of this town Superior School of West Bathurst, as well as the large schools of South Bathurst and West Bathurst during the remainder of May and perhaps some of the more remote schools as well," writes one of our hearty eastern friends, Mr. J. L. Ryan, Barrister of Bathurst, New Bruswick, who adds: "I have gone over your Special Talk and am greatly pleased with same."

"The trustees have arranged to have me address the children on Friday next and I will also take steps to present this paper before some other meetings whenever possible," writes another strong Association friend, Mr. F. A. Fisher, President of the Enterprise Foundry Co., Sackville, N.B.

"I am arranging a big picnic for Victoria Day", writes Mr. D. R. P. Coats, of Kipawa, Quebec, "and my Boy Scouts will lead in fixing sports for the kiddies. I will have all the children sit down for a quarter of an hour and listen to a little speech into which I will work the Empire idea and specially Canada and her vast forests which must be protected."

These are typical of the wholehearted co-operation given by members of our Speakers' Bureau in every part of Canada.



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG

What Public Ownership of Forests Means in Canada

Crown lands, including timber lands, in Canada are administered in most cases by the provinces in which they are situated. In the three prairie provinces (Manitoba, Saskatchewan, and Alberta), in the railway belt (a strip twenty miles on each side of the Canadian Pacific Railway's main line through British Columbia) and in the Peace River block in northern British Columbia the crown lands are administered by the Dominion Government. In this area there are few privately owned timber lands other than farmers' woodlots. Rights to cut timber are granted but the title of the land remains in the Crown. In Nova Scotia the greater part of the timber land has passed into private ownership. In New Brunswick over seven thousand square miles of forest land is owned outright by railway companies and other private concerns or individuals. In Quebec about six million acres have been so disposed of and in Ontario about five million acres. The policy of retaining the title to all timber lands has been largely followed in the Province of British Columbia in the area under provincial control as well as in the federal areas. About 2,000 square miles of timber land is in private ownership.

The ownership of forests by towns and communities, so common in Europe, is almost unknown in Canada, although efforts are being made to encourage the establishment and maintenance of forests of this nature.

A NEW GAME SANCTUARY

Acting on the petition of the property holders interested, a substantial tract of land and water in the vicinity of Arnprior, Ontario, has been created a game sanctuary by the Ontario Government. This piece of country is splendidly adapted for a refuge for game, as very little of it is cultivated, and a large part of it is covered with thick woods, which suggested the name chosen for the sanctuary, Nopiming being an Indian word meaning literally "in the woods."

The effect of this action on the part of the Government prohibits, under heavy penalties, the capturing or killing anywhere inside the aforementioned bounds at any time of the year by shooting, poisoning or trapping or in any other manner, of any wild animal or bird that is in any way protected by law.

The property holders assert that their action in this matter has not been prompted by any selfish motive, as they themselves are also bound by the act's provisions, and have no more right to shoot or trap within the boundaries of the sanctuary than has any outsider. What they wish to do, is to establish for their own pleasure and that of everyone who cares to visit it, a natural zoological park where the birds and animals that once were so plentiful in that part of the country, may be found again in their wild state.

ONTARIO'S ROAD TREES

By one of the amendments to the Highway Act the department is given the right to plant trees and carry out a system of reforestation ir corners or spaces of road allowances which otherwise would grow up wild and unkempt. Hon. F. C. Biggs thought this would be of practical as well as ornamental value to the Province.

PLANTING IN THE WEST

(*Imeroid, Sask., Magnet.*)

A. H. Norton has received a consignment of trees from the Indian Head Experimental Farm, which he has since planted for a windbreak on the north and west sides of his farm buildings.

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber **and pulpwood limits.**

■■

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." Telephone: Main 3281.

The shipment included 125 caraganas, 600 Russian poplars, 300 ash, and 250 each of wilows and Manitoba maples.

It is regrettable that the custom of tree-planting is not more general both in town and country. The absence of trees is one of the glaring defects of this district and should be overcome as speedily as possible. The Dominion experimental farm supplies the trees free of charge, the only expense being the express charges.

Any man or woman, or even a child, can plant a tree, and thus leave behind them a pleasant memorial and proof that they once existed on this earth, and that while here they contributed to making the country more beautiful. Plant trees!

U.S. LOST FIVE-SIXTHS OF ORIGINAL FORESTS.

(*N.Y. Evening Post.*)

In his report to the Senate on the cause of the high cost of lumber Secretary Meredith of the U.S. Department of Agriculture wanted to show that we

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL

MILL SUPPLY DEPARTMENT

BEVERIDGE PAPER COMPANY, LIMITED

MONTREAL

Agents from Coast to Coast

Everything in Paper Stocked in Montreal

Plastic and Liquid Roofings — Concrete Hardeners

Wood Preservative and Stains

PLIBRICO JOINTLESS FIREBRICK

Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!

IF YOU WANT EXTRA QUALITY

MILL BROOMS

SEND YOUR ORDERS TO

THE PARKER BROOM COMPANY - OTTAWA

Mention the Forestry Journal for your identification.

have been treating our forests badly and he used striking facts to prove it. Five-sixths of the virgin forests of the United States have disappeared. Only one-eighth of New England's timber remains. New York manufactures only one-tenth of the lumber required in the State. Pennsylvania's lumber cut is less than the amount consumed in the Pittsburg district alone. We are using lumber four times as fast as we are growing it. Two-thirds of the timber left is west of the great plains, one-half in the thre Pacific coast States.

But Mr. Meredith does not mean that the situation is so serious as these facts might suggest. His purpose is to drive home the lesson that scarcity has not resulted from the use of forests but from their devastation, from our failure while drawing on our reservoirs of virgin timber to use our timber growing land. "We cannot afford," he remarks, "to cut our use of lumber down to the level of European countries, where lumber is an imported luxury. We must produce the great bulk of the timber which we need, and we have the resources for doing so."

ADVERTISING AND PULP.

A prominent New York publisher, in an address to the Cleveland Advertising Club, said that if the growth in advertising which has taken place during the past two years were continued, in 10 years the United States and Canada would have depleted the forests of America.

WOODS MANAGER WANTED.

"Wanted, Manager for woods operations by Pulp and Paper Mill using 35,000 cords pulpwood annually Must be experienced and able to take full charge of operations. Apply, stating experience and salary required, to D. P. Company, care of Canadian Forestry Journal."

The FOX Seven Pound Portable Typewriter



A portable machine that will do all that a high-priced typewriter will do, and at the same time light and compact enough to carry easily. Will answer the writing requirements of almost any individual or firm.

Write for Descriptive Circular.

Price in Case
$75.00.

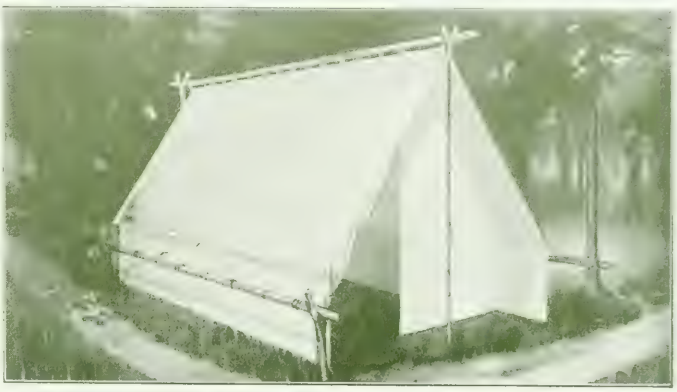
TYPEWRITER DIVISION,

Photographic Stores, Limited

65 SPARKS STREET, OTTAWA, ONT.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country
Very Easy Bleaching Sulphite
Spruce, Pine and Hemlock Lumber
Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Mention the Forestry Journal for your identification.

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates

JAMES W. SEWALL Old Town, Maine.

Mention the Forestry Journal for your identification.

ATTENTION ! Fire Equipment, Limited, is a manufacturing concern, not jobbers.

We have all kinds of fire fighting appliances for bush fires, such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West : : : Montreal.

Does a Shelter Belt Pay in Dollars?

By Carlos G. Bates, U.S. Forest Service

Windbreaks are, in more ways than one, a farm asset. They tend to prevent the soil from drying out quickly and they protect grain and orchards from mechanical injury by the wind. A belt of trees by the farm buildings protects them from extreme winter cold and summer heat, and makes the farm a pleasanter place in which to live. The windbreak may also be a source of wood supply for use on the farm or for sale.

The effect of a windbreak on crops is not beneficial in every respect. There are certain ways in which it is plainly injurious. Trees in a windbreak always spread their roots extensively into the adjoining fields in search of moisture; and they take not only the moisture but some of the nitrogen content of the soil. Furthermore, by shading the ground they may prevent crops from developing properly.

Whether the total effect of a windbreak is good or bad depends upon whether the benefiits derived from its influence on wind movement, temperature, and evaporation are greater or less than the injury resulting from the sapping and shading of the ground near them. To determine the total effect, crop measurements have been made in Nebraska, Kansas, Iowa, and Minnesota. Average rather than exceptional conditions were measured, the object being to discover the effect of those influences which are continuous and affect every annual crop grown.

Measurements made in fields of small grain indicate that the crop gain

FIRE HOSE FIRE EXTINGUISHERS
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.

30 St. Francois Xavier St. - - MONTREAL

REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

Mention the Forestry Journal for your identification.

RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

in the protected zone is sufficient to offset fully the effects of shading and sapping. In a wheat field protected by a dense windbreak the grain amounted to about 10 bushels per acre where the protection was most complete, and gradually grew less as the distance from the windbreak increased. The total gain was about equal to the amount of grain which could have been grown on the shaded ground near the trees. The season in which the measurements were taken was not of high winds, nor did it lack moisture. It would appear, therefore, that in a windy year when evaporation was high the total gain for the field would much more than balance the loss. In another case, barley on the south of an ash and honey locust windbreak

"Canoes that have made Maps and History."

EXPLORERS, TRADERS AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS

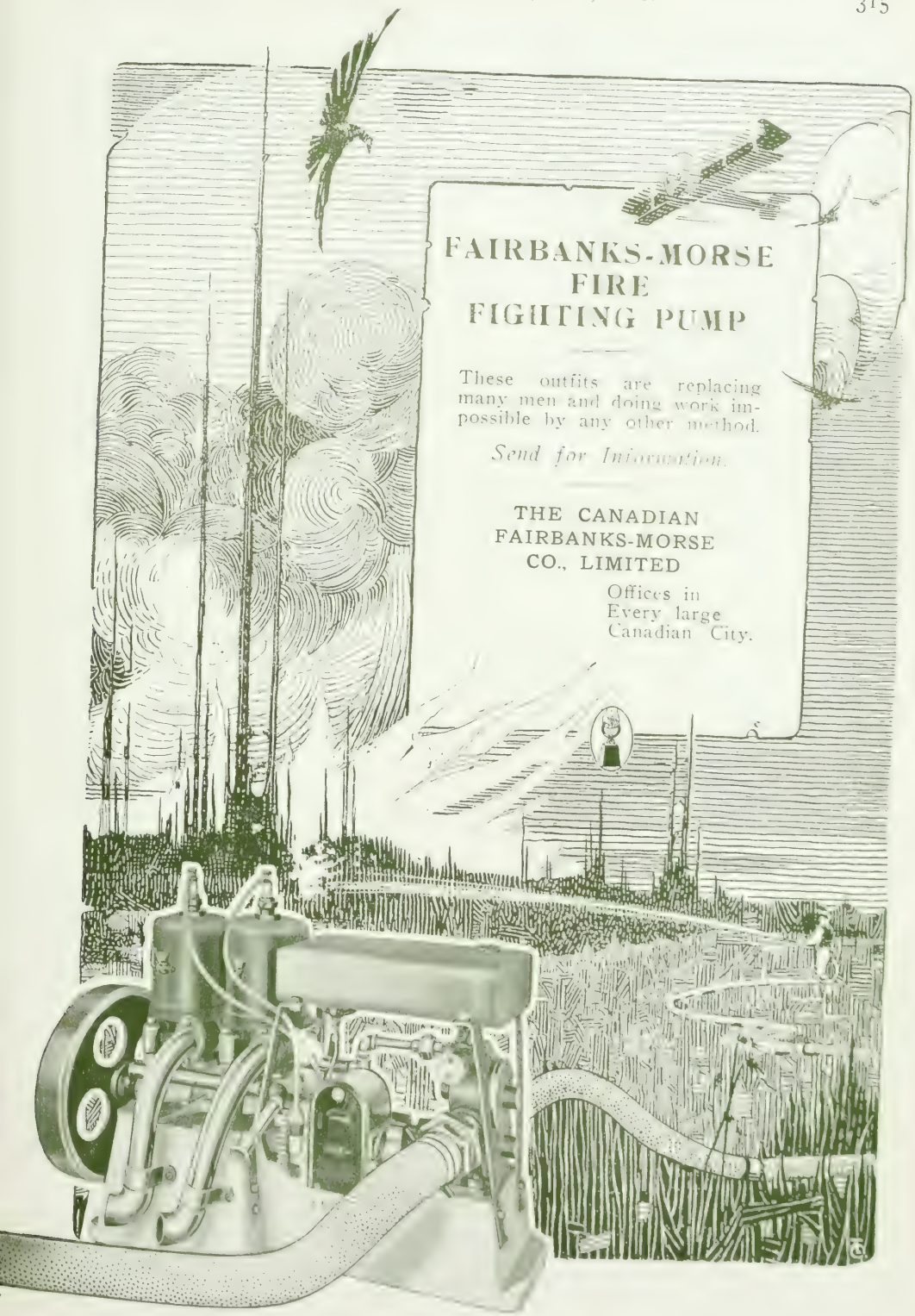
When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE & BOAT CO., LTD.

LAKEFIELD ONTARIO CANADA

Mention the Forestry Journal for your identification.


FAIRBANKS-MORSE
FIRE
FIGHTING PUMP
These outfits are replacing many men and doing work impossible by any other method.
Send for Information.
THE CANADIAN
FAIRBANKS-MORSE
CO., LIMITED
Offices in
Every large
Canadian City.

benefited very materially from the accumulation of snow in the lee, and the conservation of this moisture. Here cultivation was possible within 4 feet of the stems of the trees, so that the increased yield of the field, amounting to about 14 bushels per acre at the highest point, was practically clear gain. The total gain for the whole field amounted to the yield of a strip of ground as long as the windbreak, and three times as wide as its height. In other words had the windbreak, which was 20 feet high, occupied a strip of ground 60 feet wide, the gain in the field crop would have paid the rental on all of this ground.

The corn crops showed more consistent and marked benefits from protection than any others. In the region concerned the summer winds are almost wholly from the south, so that the only effective rows and belts extended in an east-west direction. The effect on corn was very marked for a short distance on the south side of such windbreaks and for a much greater distance on the north side. Fields of young corn showed much better growth in the area protected and warmed by the windbreak. The effect was visible to the eye early in the season, which was rather cool. Height measurements on one field showed the plants to be 4½ feet high in the first 18 rows next to the windbreak, while beyond this protected zone the height was only 2½ feet. This luxuriant growth was still in evidence at the end of the season, and not only produced more fodder, but bigger and heavier ears. The field showed a production of 59 bushels to the acre in the protected part and only 41 bushels in the exposed part. The net gain, including the area shaded by the grove, was equivalent to the yield of a strip twice as wide as the height of the trees, which were 38 feet high. The increased yield paid, then, for a strip 76 feet wide. The windbreak happened to be wider than this, but need not have been to afford the same amount of protection.

LUMBERMEN ATTENTION!



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,
BATHURST NEW BRUNSWICK

WANTED
150 lbs. White Spruce Seed
(Picea Canadensis)
LINCOLN WOOD PULPCO.
Box 923 BANGOR, MAINE

TREES, SHRUBS and SEEDS
HARDY NORTHERN TREE STOCK
EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Mention the Forestry Journal for your identification.

With ordinary field crops the farmer may count on a benefit from windbreak protection which will make the loss of the area occupied by the trees negligible. Under Middle Western conditions a windbreak whose width does not exceed two or three times its height will more than pay for itself, regardless of the timber which it may produce. Farther east the same kind of influence and benefit will exist, though in a less marked degree, and a greater direct return may be expected from growing the timber for its own value, so that the need of even a slight amount of protection should make windbreak planting attractive.

In any region the windbreak should be so laid out as to offer the greatest resistance to damaging winds and to protect the greatest area. This simply means having the belt or row at right angles to the prevailing winds.

In addition to affording protection to crops and buildings, the windbreak usually has considerable value as a source of wood supply for use on the farm or for sale. In the following estimates of the timber value of various kinds of windbreaks the acreage on which the figures are based includes not only the ground actually occupied by the trees but also that

Try This Stump Puller at Our Risk The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sta.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA



CEDAR

We are in the market at all times for clear EASTERN Cedar. We also buy clear cedar lath, special sizes.
If you are cutting any cedar write to us for particulars.
PETERBOROUGH CANOE Co. LTD
PETERBOROUGH CANADA

J

The JOST COMPANY, LTD.
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.
THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.



QUEEN'S UNIVERSITY
KINGSTON, ONTARIO
ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.

IF YOU WANT A CHEW
THAT WILL JUST SUIT

YOU ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.

Sault Ste. Marie, Canada.

which is shaded and sapped. The estimates are for annual income per acre, discounted at the rate of 4 per cent from the final value of the timber when cut. No allowance is made for the cost of planting.

Cottonwood rows and narrow belts planted in fairly moist bottom lands yield an income of from $2.64 to $8.01 per acre, the greatest values being obtained by cutting after the age of 40 years. Good returns can not be expected from any but moist situations.

Willow planted on thoroughly moist soil yields from $4.17 to $15.81 worth of posts per acre, the highest values being realized when cutting is done between the ages of 14 and 20 years. When utilized for fuel, willow yields an income of from 72 cents to $2.78.

Green ash yields from $2.53 to $6.51 in posts on the best class of soils, and from $1.84 upward on poorer soils. It is an excellent auxiliary to cottonwood, but will make good growth on much more unfavorable situations.

RE, PROF. MacPHAIL'S SPEECH

Editor, Canadian Forestry Journal:

Referring to the recent address of Professor MacPhail which you dealt with in the last issue of the "Journal" it may be interesting to recall the words of Mr. G. K. Chesterton, which will be found at Page 56 of his entertaining little book on Blake:

> "The trouble with the expert is never that he is not a man; it is always that wherever he is not an expert he is too much of an ordinary man. Wherever he is not exceptionally learned, he is quite casually ignorant. This is the great fallacy in the case of what is called the impartiality of men of science. If scientific men had no ideas beyond their scientific work it might be all very well; that is to say, all very well for everybody except them. But the truth is that beyond their scientific ideas, they have, not the absence of ideas, but the presence of the most vulgar and sentimental ideas that happen to be common to their social clique. If a biologist had no views on art or morals, it might be all very well. The truth is that a biologist has all the wrong ideas of art and morals that happen to be going about in the smart set in his time."



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

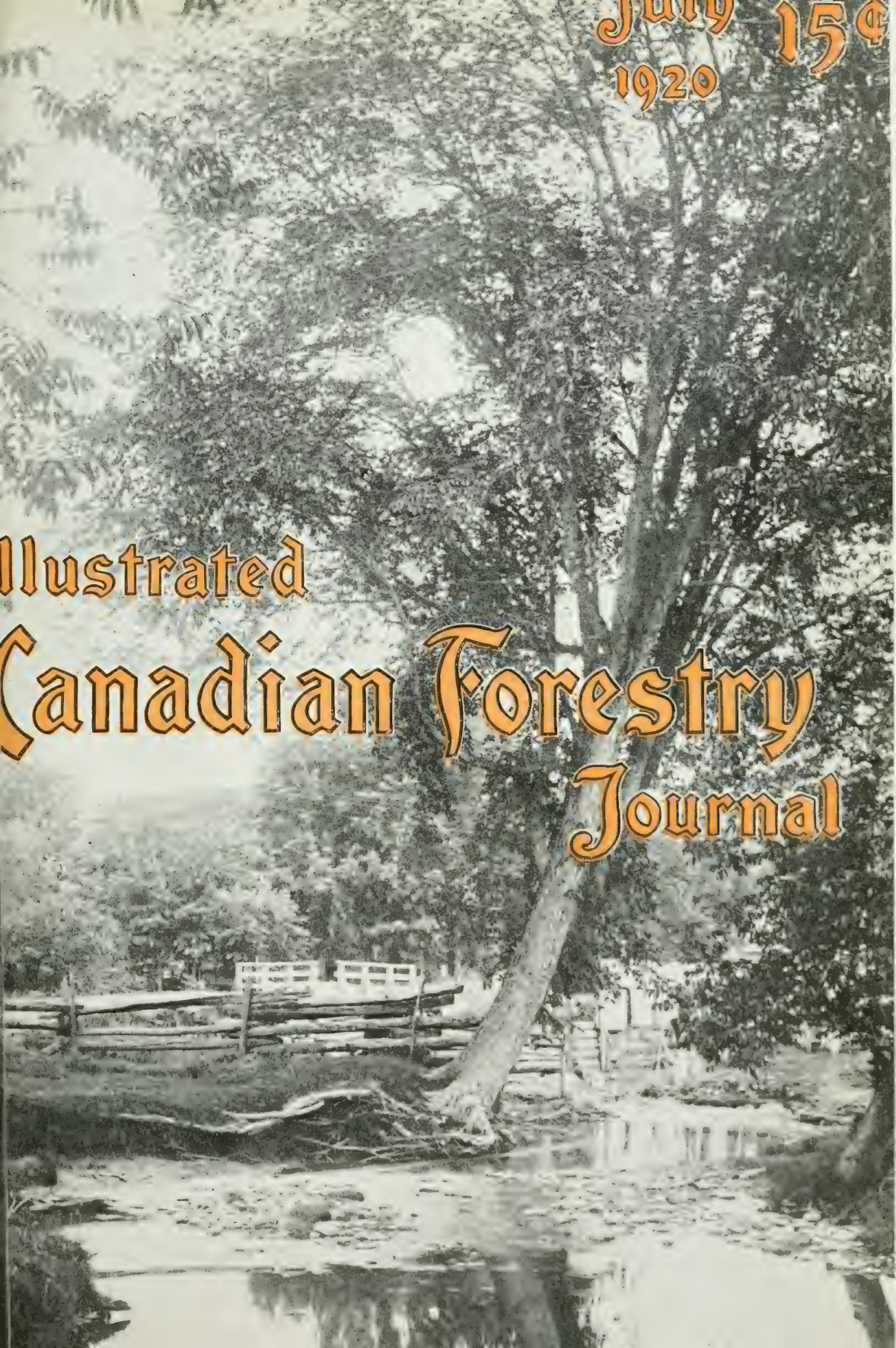
Royal Securities

Corporation
Limited

MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG

Mention the Forestry Journal for your identification.


July 15¢
1920
Illustrated
Canadian Forestry
Journal

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

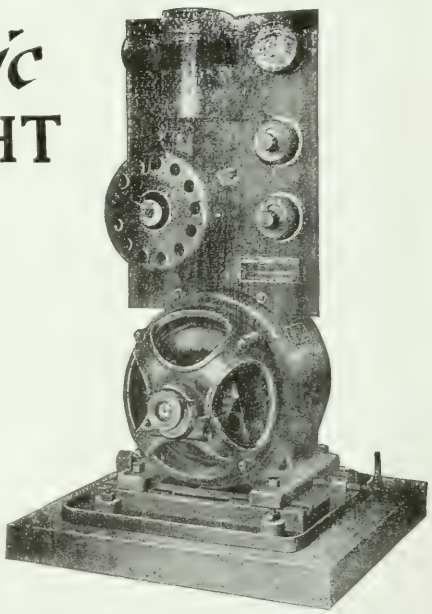
OTTAWA
CANADA
Dept. D.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

Mention the Forestry Journal for your identification.

VETERAN TRUCKS

BUILT IN CANADA

2½ TON (LONG, MEDIUM OR SHORT WHEELBASE)



Immediate Delivery from Stock — Real Service

Overload demonstration carried out by the Ottawa Improvement Commission using 2½ ton Veteran Truck Chassis and Cab.

Pay Load	6900 lbs.
Chassis and tank	7920 lbs.
Gross weight	14820 lbs.

The truck worked for two days under these conditions, and was then taken to the factory, taken down and all parts examined. This examination disclosed no signs of damage or strain.

Catalogue on Request.

Eastern Canada Motor Truck Co., Limited

HULL, QUE.

Mention the Forestry Journal for your identification.

Here's a Harness

Worth Investigating!

Conserving horse power means money for you. And the best way to get the utmost out of your horses—is to furnish them with best possible equipment.

Our "Carson Quality" Michigan Lumber and Skidding Harness is the best possible equipment that money can buy. It is made of the extra quality oak tanned leather—by skilled Canadian workmen. It is built to stand heavy strains and it "delivers the goods."

We are operating one of the most complete and up-to-date harness factories in Canada—giving unexcelled service in supplying, sorting up orders for all harness parts, hardware, etc. Let us know your wants.

Ask us to send you full information.



Michigan Skidding and Lumber Harness

Carson Quality

We are now manufacturing a special line of pack sacks at particularly low prices. Ask us about them.

Hugh Carson Co. LIMITED

72 ALBERT ST., OTTAWA, CANADA.

Laurentide Company

LIMITED

GRAND MERE, QUEBEC

MANUFACTURERS OF

Groundwood Pulp
Sulphite Pulp
Newsprint Paper
Cardboard

Mention the Forestry Journal for your identification.

CIRCULATION: 11,300 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Journal

VOL. XVI. KINGSTON, CANADA, JULY, 1920. No. 7

The Walnut Plantations at Point Platon

By Major Alain Joly de Lotbiniere



Remarkable Success Achieved on Famous Quebec Seignory--Importance of Wind Protection



The Black Walnut Plantations set out by my grandfather, Sir Henri Joly de Lotbinière, 37 years ago, were in the nature of an experiment rather than a commercial enterprise. It was his purpose to prove that this valuable and beautiful species of exotic could, if the necessary time and care were taken, equal if not rival the growth of our own native species of the Province of Quebec. I believe that he succeeded, and in the following paragraphs hope to lead the reader to think so too, and to impress on his mind one vital requisite if he wishes to put his belief to proof. I will first explain, then, how these experiments were carried out, what the results have been, and what conclusions may be drawn from them.

How the Experiments Were Carried Out.

The Black Walnut (Juglands nigra), can hardly be called a native of our country, except for certain portions of Southern Ontario, its most prolific habitat ranging from New England to Minnesota and then South to Texas. It will be seen at a glance that the natural habitat comes under very different climatic conditions from the Province of Quebec, where the tree must be prepared to meet our rigorous climate of intense heat in the summer and the cold icy blasts of the winter months. Our Province would then seem to be the last place in the world to support the Black Walnut in any semblance of normality. But Sir Henri thought otherwise, and set out to demonstrate his theory in the following manner: First of all he chose three different sites to carry out his experiments:—

1. A cultivated soil (protected on all sides from the wind).

2. An alluvial soil (protected from the wind on one side only).

3. A boulder clay soil.

In these three soils he planted the nuts of the Black Walnut one late spring day when the frost had disappeared from the ground. The week previous he had soaked them in tepid water to awaken the tiny germ which would be called upon in so short a time by mother earth to fulfil its destiny, and into holes which he had staked out, 4 feet apart, he buried them two inches deep.

When Autumn came each little plant, and there were many of them, was very carefully covered with straw to protect it from the snow and ice, and then tied to a stake to keep it from being crushed. And although my grandfather was engaged in his parliamentary duties, he carried out this somewhat tedious work himself with only one man to assist him. It was only after 4 or 5 winters that this practice was discontinued, as by that time, with the rapid head growth which characterizes this species, its delicate

crown had got beyond the destructive snow level.

The crisis appeared to have been passed, but nature, through its powerful agent, the north-east wind, still disputed the "young emigrants" their right to live in their adopted land. The wounds made by the wind-blown branches on the bole of the trees had not sufficient time to heal in our comparatively short growing season, and as a result each year saw nature's unsuccessful attempt to close up the wound, resulting in a series of concentric rings, each growing successively larger than its predecessor. From a scientific point of view this was interesting, but it did not betoken any good to the young saplings, which were making such a brave stand. Some preventative must be found, and my grandfather anxiously cast about to find a remedy. He saw that there was only one thing to be done, and that was to protect them from the ravages of the wind and to carefully prune the branches which had been broken. In hardly less time than it takes to say it, he had planted a willow hedge as a wind break and had carefully gone over all his trees with his pruning knife. Although this was not a sovereign remedy, it assisted the plantation materially.

What the Results Have Been.

On a late spring day, the same season when the first Black Walnuts were planted, 37 years ago, it has been my pleasure to enter a grove of tall, clean limbed trees, fragrant with the breath of new green leaves. This is plantation No. 2, the one I mentioned as having been planted in an alluvial soil, and the one I have considered as the most successful, not so much from the size of the trees, for the plantation on the cultivated soil boasts of larger ones, but from the fact that it illustrates more clearly and definitely the salient points these experiments have to teach us.

If one looks at the profits of this plantation, photograph No. 1, one is struck with its resemblance to the side of a sloping roof, the apex consisting of the largest trees being under the lee of a hill, and the eaves, the smaller trees, growing in the open. Now, although these trees were planted in the same year, there is such a marked difference in growth that it will be interesting and instructive perhaps to compare their height and diameters.

It will be found that the average diameter of the trees in the lee of the hill is 7 inches, while those in the open have only a diameter of 4 inches. Taking the age of the plantation as 37 years, the diameter growth of the former would be equal to 1 inch in 5 years. In other words, the trees in the lee of the hill have grown almost twice as fast as those in the open. The height growth bearing very much the same proportion, as will be seen from the following table:



Walnut Plantation No. 2.



Walnut Plantation No. 1.



Walnut Plantation No. 2.

	Age.	D.B.H.	Height.	To grow an inch.	Site.
Black Walnut	37 years	4″	32′	9 years	In the open
Black Walnut	do.	7″	55′	5 years	Protected
Paper Birch	40 years	6.8″	54′	6 years	
Chestnut	do.	do.		do.	
Oak	do.	6″	57′	do.	

Conclusion.

The reader, if he has had the patience to read this far, will without a doubt be relieved to know that there are no more tables to be consulted, and although I am going to refer him once more to the one he has just read over, it is not with the intention of imposing on his good graces, and if any one is to blame, I think that that ancient Greek philosopher, Pythagoras, should be, as he made arithmetical figures the basis of his philosophy, and ever since we have been burdened with them.

I have referred to the very striking difference in growth between the trees which were planted in the open to those planted near the hill. The reason for this is quite simple, for those that were planted near the hill were sheltered from the wind, while the others were not, and it is just this single condition that has made all the difference, for PROTECTION FROM THE WIND IS THE KEYNOTE TO SUCCESS in planting the Black Walnut in a cold climate, allowing for the fact that the trees are planted on a good soil and are given a fair start.

Finally, if you will again consult the table you will see that the Black Walnut can compare very favourably in growth with our native Canadian species, and when you consider its value from a commercial point of view, especially for use in the construction of aeroplane propellers, you will agree with me, I am sure, that he who plants this tree has the future of his country at heart, for although he may not, himself, always taste the fruit of his labour, those that follow him will without a doubt rejoice in the good fortune he has bequeathed to them.



Maligne Lake (Courtesy Dominion Parks Branch).

Our Canadian Maples

By B. R. Morton, B.Sc. F.



Large-leafed Maple, Vancouver Island—(Courtesy of Dominion Forestry Branch).

There are no trees in Canada more popular for shade purposes than our maples. If a census were taken of the trees in our towns and cities, they would lead numerically. Although we have a hundred or more trees from which to choose, probably eighty per cent. of our city trees are maples. The reason for the maples' popularity, however, is easily apparent. As a whole, they are healthy trees with luxuriant foliage, producing abundant shade. They are symmetrical, and their forms adopt themselves readily to the requirements of the street and town. They are fairly rapid in growth.

Distribution

We have ten native species of maples. No other tree with the exception of the oak is represented by more species. There are eleven native oaks, most of them confined to a very limited range in south-western Ontario. Of our ten native maples, only five are used to any extent for shade tree planting. Throughout Eastern Canada four of them, the hard or sugar, the white or silver, the red or soft and the Manitoba or box elder are most commonly planted. In addition to these two species imported from Europe—the Norway and the sycamore maple are

widely used. In the prairie provinces the choice is restricted to the Manitoba maple. No other species has been found sufficiently hardy for general planting there. British Columbia, particularly in the coast region, is more fortunate, for there, all our eastern maples, in addition to that splendid native one, the large-leaf maple, may be grown.

The Hard or Sugar Maple

For our eastern towns and cities the hard or sugar maple is one of our best trees. It is an ornament to any street, erect, compact and symmetrical in habit. When young it is oval shaped, but as it gets older the crown spreads out into a broad rounded dome. The branches divide into many twigs, which form a fine network against the sky, so that the beauty of the tree is not lost even in the winter when bare of foliage. The brilliant autumn foliage of the sugar maple, with its shades of yellow, orange and red, is unsurpassed by any other tree. Unfortunately in most of our streets this tree is not given sufficient room for the free development. They should be spaced at least forty feet apart, so that when mature the full beauty of their form and foliage may be seen.

The Red Maple.

The red maple is also a good street tree, and when once established, its growth is somewhat faster than that of the sugar maple, especially if the soil is rather moist. It is well adapted to narrow streets, but should not be planted too close together. Thirty-five to forty feet should be allowed between trees. The summer foliage of the red maple is of a lighter green than that of the sugar maple, and though it looks well at all times, it is when decked in its scarlet colours in the early autumn that it appears at its best. The red maple is one of the first trees to show its colour in the fall.

The White or Silver Maple.

The white or silver maple does not make so good a street tree as either the sugar or red maple. It has a beautiful form with wide spreading limbs, drooping at the ends, but one of its chief disadvantages is the brittleness of its branches, which are broken by every heavy storm and mar its appearance. It makes rapid growth, and for this reason has been largely planted.

The Manitoba Maple.

The Manitoba maple also makes very rapid growth. It has been planted throughout Eastern Canada by well-meaning citizens. It is, however, not the best tree to choose, where the sugar or red maples may be grown. Of all our street maples it has the most irregular form, and constant trimming is required to keep the tree in good shape. None of our maples are more hardy, however, and it is, therefore, an excellent tree for the prairie provinces and those parts of the country with severe winters.

The Large-leaved Maple

For the southern coast region of British Columbia there is no better shade tree than the native large-leaved maple. This tree has been well named for its leaves, from 7 to 14 inches wide, with stems 6 to 12 inches long, are the largest of all our maples. There is no finer sight than the massive dark green crown of this tree when it has been permitted to develop to its full size.

The Norway Maple.

The Norway maple is the best of the two imported species commonly planted in Eastern Canada. It is hardy and seems to withstand city conditions even better than our native species. It is an exceedingly attractive tree with its round form and rich green foliage. The leaves are somewhat darker and larger than those of our sugar maple, which they otherwise closely resemble.

NOVA SCOTIA FIRES

No. of Fires.	Cause.	Damage.
5	Children	$ 904.00
7	Farmers	$ 7,220.00
2	Smokers	$ 1,001.00
17	Railway	$ 1,520.00
37	Unknown	$11,680.00
13	Fishermen	$38,950.50
3	Portable Mills	$ 1,550.00
1	Incendiary	$ 500.00
Tl. 85	Total..	$63,439.50



CHARLES LATHROP PACK,
President American Forestry Association.

Forestry and Friends

By Charles Lathrop Pack, President, American Forestry Association.

Through a curious turn of events the two great English-speaking countries of North America are to be brought still closer in friendly relations. The World War, of course, was a great forward step to be taken in that friendliness. We are now about to see, I am told, a minister from the land of the Maple Leaf appointed to represent his government at Washington. This is a step in the right direction. Of late there have been misunderstandings, fostered by these with mistaken motives, but these will soon be swept away. These misunderstandings have come about over the pulp wood and newsprint situation, as it involves the two great countries. I believe it can be honestly stated that out of this misunderstanding there will come, yes, even now has come, the right view point. It all points to the need of a national forest policy on bothsides of that imaginary line we call the boundary. I think I am safe in predicting that through national legislation on forestry, the friendship of the two countries will be cemented more closely than ever. If this comes about, and I am sure that it will, it will certainly be a great tribute to those of us both in Canada and the United States who have labored so long and patiently for this reward.

In the United States the newsprint paper problem has resulted in placing the broad problem of forestry before the people. Will it not have the same effect in Canada? Will the outcome not be an awakening to the value of the forests, the backbone of all industry, and will not this result in what we have worked for these many years, a national forest policy with better fire protection as the first step? What a great monument such a result would be to the work that has been done. I see a still greater reward for the forester; the bringing together of the two countries because of their mutual interest in the perpetuation of the forests.

To the forester comes a great opportunity out of the present situation. The publishers are hard pressed; the home builders are hard pressed, and when we find this situation in these two great industries inquiries must naturally result. What have we been doing with our greatest natural resource? At this point the forester comes into his own. His knowledge takes on added value. Every wood using industry cries for action. The action wil come slowly, a great lesson is to be learned and the forester will become the teacher in the great school in which forest perpetuation will be the watchword.

The millions of acres of undeveloped country in the great land to the north of us cannot help but react to the advantage of the United States in that development. We cannot live to ourselves any more than can you, our neighbors, live to yourselves. In the working out of that development comes the still greater friendliness that will result in a united people greeting each other across a dividing line that is found only in geographies. I feel that a broad understanding of our common forestry problems will bring that about.

ORGANIZERS WANTED!

The Canadian Forestry Association will employ, at good remuneration, Organizers in the following cities: Vancouver, Victoria, Calgary, Edmonton, Saskatoon, Regina, Winnipeg, Toronto, Ottawa, Fredericton, St. John and Halifax.
A sterling opportunity for profitable and dignified employment. Applicants must have had successful records in some form of salesmanship.

Jackson Bldg., Ottawa.

The Training of a Forester

By Dr. C. D. Howe,
Acting Dean, Faculty of Forestry, University of Toronto

An Interesting Description of an Undergraduate Forester's Training in Canadian Forest Schools

The education of a forestry student centres upon and revolves about a living tree, since the chief object of the forestry profession is the production of trees for utilization by the various wood-using industries. So long as nature unaided produces trees in quality fit for the manufacturing arts, in quantity as great as that used by lumbermen and destroyed by disease, fire and wind; there is no economic necessity for creating trained brain power to be applied to the production of trees in order to supply the manufacturing industries. Such need develops slowly, and is dependent upon many economic and industrial factors. The realization of the need comes even more slowly, for public opinion is lethargic, often insensible to the solution of problems whose effects lie beyond the present, and the making of trees for pulp-wood spans one generation, and the production of good saw logs spans two generations of men. Of necessity foresters have been more propagandists than foresters in the strict interpretation of the word. After thirty years of unremitting toil the tide is beginning to turn in their favor. The oft-repeated statements that over one-half the commercially forested area of Canada, about 1,000,000 square miles, has been burned, and that forest destruction by fire still continues practically unabated, except in wet seasons, in some of the most valuable forest regions in the country, are bearing fruit, and the significance of such facts in relation to the future prosperity of Canada is beginning to penetrate the public consciousness. In order to maintain at reasonable cost continuous supplies of wood for the industries, forestry should begin with forests which nature has made and not with deserts that man has made. It is both illogical and expensive to destroy and build anew after many years what might have been kept continuously productive under intelligent direction. It must be admitted, however, that recent events such as the soaring prices of lumber and newsprint, the disclosures of callous indifference to the just dues of the people on the part of those charged with the administration of the forests in certain portions of the country, the possibility of strained international relations over pulpwood exports, the scramble for supplies in far remote regions of the country on the part of certain great wood-using industries have focussed the attention of the public upon the necessity of conserving our forest resources. In fact, some of the conditions foretold by propagandists are already upon us, conditions which we are in a measure unprepared to meet because we have not developed a sufficient number of men properly trained to solve some of the most urgent problems, and a good portion of these very problems are concerned with the habits and peculiarities of our most valuable trees.

The Tree as a Starting Point.

With this introduction, I will come back to my first statement. For the actual practice of forestry, the tree or rather an aggregation of trees, the stand, is the nucleus about which all knowledge revolves. In the first place the forestry student is introduced to trees as individuals. He studies their characteristics as revealed by their flowers, fruits, leaves and bark, and he learns how to recognize them and call them by name when he meets them in the forest. A tree is a plant, and in many ways the most successful plant nature has ever produced. Thus in order that the student may gain a proper perspective he is given a course in



Yellowhead Pass, Jasper Park (Courtesy Dominion Parks Branch).

Botany, where he learns about the long series of experiments and trials by which nature finally perfected our modern tree. All through his work in forestry he will come in contact with other plants which influence to a greater or less degree the lives of trees, and he gets acquainted with them in his course in Botany. In a similar manner there are animals, particularly insects, that affect trees often disastrously. These are not studied in the first year, but the foundations for such study are laid by the course in Zoology. In most forestry schools a kind of introductory course to forestry is given to the first-year students, in which the forest conditions of the country and methods of lumbering are described, the principles of forestry are laid down, and the work of the various forestry organizations is presented.

Mathematics and Forestry.

Unless a practising forester is thoroughly grounded in mathematics he is handicapped throughout his professional life, since the principles of estimating and measuring timber, topographic and land surveying, making roads and trails, etc., are based on mathematics, and so this subject is stressed in all forestry schools. Chemistry and Physics are fundamental subjects, and they are studied during the first year. The forestry student usually takes French or German in the first year, and at Toronto the language he selects he must continue for three years.

By this time the student, if successful, has completed his first year. His summer holidays are taken in the bush, where he carries chain or calipers trees in a timber cruising party, or assists in land classification and reconnaissance surveys, or works in a sawmill, in a paper mill, or on a log drive or acts as a camp cook; in fact, he takes any job that will give him practical experience. He may fight flies or other pests continuously; he may sleep on the ground in wet blankets during two weeks of continuous rain; he may spend his time on his knees in a forest nursery; he may repeat the same operation over and over again until the monotony of the thing nearly drives him frantic, but it stiffens the backbone and it is all good for the soil; it weeds out the non-courageous and the

non-persistent. Those who come back to us after the first summer we no longer call boys, but men.

In the Second Year.

During the second year the forestry student gets a still more intimate knowledge of trees both as individuals and in their economic aspects. He learns how trees come into existence, how they live and work and, not least, how they get along with their neighbors. He studies the methods of determining the contents of single trees and stands of trees in terms of cords or board feet. He learns how the rules for determining the board feet in a log were made, and is shown why some of those in use are so unjust to the seller. He is taught how to make volume tables according to the diameter of the trees or to the diameter height or according to the diameter and the number of logs in the tree. He is thoroughly grounded in the methods of cruising and estimating timber and the application of the various methods to the different parts of the country. The student counts the rings on stumps or at the ends of logs and determines the present volume of the trees, and the contents ten, twenty or thirty years ago, and he predicts what the contents will be ten, twenty or thirty years hence. Grouping the trees together according to diameter and rate of growth, he can predict future yields on a given acre or on a larger tract.

The course in Surveying begins in the second and continues through the third year. The forestry student is made familiar with the general principles of surveying and the instruments used, such as the compass, chain, plane-table and transit, with practice in their use. The student in his second year also learns how the earth has been made as well as the making of the trees that grow upon it. The origin of the various Canadian rock formations is described and their distribution is determined. At the same time he is taught to distinguish at sight the common minerals and rocks. The course in Chemistry is continued from the first year, and the course in tree description and identification extends down through the shrubs and other woody plants that are found growing beneath the forest.

The second year students in their summer work usually get positions of increased responsibility—and they get more pay.

We have now gotten the student half way through his course, and we will leave him there until next month's issue.



De Havilland Aeroplane—(Courtesy Air Board).

Price Bros., Limited, Aerial System

An Interesting Description of a Canadian Pulp and Lumber Company's Aerial Operations

One of the striking features of the Great War was the remarkable work accomplished by the aeroplane and the great benefits that might be derived from its use by the business interests throughout the world, and among those who were attracted by its possibilities were a number of Canadian lumber firms. To the war also can be attributed the tremendous advance in recent years in the development of aircraft, both in respect to the mechanism and its control on the part of the pilots.

Among the firms that were quick to realize the great advantages likely to result from putting into force an aerial service was that of Price Brothers, Limited, of this city, whose limits cover an area of over 8,000 square miles, scattered throughout the Eastern part of the Province of Quebec, and the following summary of the work that will be done, the equipment used and the personnel employed by the Company, which is but a prelude to more extensive aerial operations, will, no doubt, be read with interest, not only by those engaged in the lumber business, but also by those who have the welfare and progress of their country and province at heart.

Photography and Mapping

The operations will consist of photographing with special aerial cameras a part of the limits of Price Brothers & Co. The photographs once developed will either be enlarged or reduced to a predetermined scale, built into mosaic maps and then re-photographed into finished aerial maps ready for comparison with known surveyed ground. Special photographs of dams, river heads, burnt areas, ets., will be made from photographs taken at a height of 1,000 feet. The cameras that will be employed are two Thornton Pickard as were used on the Western Front during the late war, also one Model K-1 Aero Film camera that contains a roll of 100 films; this latter camera is used solely for map making and survey work; a plane flying at 10,000 feet can photograph with a single roll of 100 films over 75 square miles of territory, allowing for overlaps.

To facilitate this work the maps of the Province of Quebec have been squared according to the military system used during the war. The squaring and lettering system has been approved by the Forestry Branch of the Provincial Government of Quebec, and several large lumber firms.

Type of Machines

In the carrying out of this work special attention had to be paid to the class of machines provided, and those to be employed are two Martinsyde type "A" Mark 1 Seaplanes, convertible into land planes, both of which are equipped with a Falcon III Rolls Royce 12-cylinder engine of 275 H.P. Their climbing power with full load of 1,000 lbs. is 10,000 feet in 15". They have a maximum speed of 127 m.p.h. Either 1,000 lbs. of cargo and a pilot, with fuel for seven hours, can be carried; or 2, 3 or 4 passengers, with 200 lbs. of cargo and pilot. When it is decided to carry out more extensive flying operations more of this type of machine will be employed.

All equipment used in this department was purchased in England, and is the very best of its kind for the work.

Staff

Realizing that the nature of the work required, the utmost skill on the part of those engaged upon it, the firm of Price Brothers, Limited, set about obtaining men whose attainments in the art of flying left no doubt as to their qualifications in this respect, and all pilots employed are late Offi-



Large-Leafed Maple, Vancouver Island (Forestry Branch), Dominion.



Red Cedar, Hemlock and Douglas Fir near Chilliwack.



Model 40 Flying Boat—(Courtesy Air Board).

cers and Instructors in the Royal Air Force, who have had an extensive experience in flying with different kinds of engines.

Due regard was also paid to the ability of the mechanics employed, and these also are late of the Royal Air Force, experienced in all makes of planes and engines both before and during the war, and in every respect are fully competent to perform the work required of them.

The photographers are men who during the war gained their valuable experience at the front, and it is interesting to note that, in this connection, one of these men built the largest mosaic map of the Western Front during the war. This work is perhaps the most important to be done in connection with Price Brothers & Company's aerial operations, and with the photographers rests a great deal of the responsibility for the ultimate success of the undertaking.

Aerial Transportation.

Owing to the extensive limits of Price Brothers & Co., and the difficulties therein, it is a very difficult matter for bush managers and superintendents to keep in close touch with outlying operations. In the past it meant a trip of several days, with much waste of time, due to bad roads, floods, etc. Today this difficulty is solved by the aeroplane. The manager can now start in the morning, visit any part of his district comfortably, without waste of time en route, and be back by evening —a great saving of time and energy to the manager, and in case of something serious happening, a quick and efficient way of getting to the scene of operations.

Again, in the case of a cruising party who are setting out on an exploring trip through some distant limits, they can be transported quickly to the nearest possible point with provisions, etc., thus saving considerable cost and supplies.

SCENES AT THE LAURENTIDE COMPANY'S NURSERY



Trench for Transplants.



Transplanting.



Transplanting with Transplant Board.



Lifting Transplants with Fork.



Loading Transplants.



Lifting 2-year-old Seedlings.

Reforestation and Pulp Companies



By

ROBERT W. LYONS, B.Sc.F.,

Forester in Charge of Reforestation,

Laurentide Company, Ltd.



More than seven years ago, in 1912, the Laurentide Company, Limited, established a small nursery at Grand Mere. At this time, little was known concerning the operations connected with the growing of tree seedlings, and, consequently, the first three or four years were spent in experiments and in learning the fundamentals applicable to Northern Quebec. At the end of three years, however, the knoweldge gained prompted the Company to take a great and effective interest in reforestation.

Therefore, in 1916 the purchase of waste land for the propagation of a new forest was begun. It was decided to establish a permanent nursery at Proulx, 6 miles north of Grand 'Mere, conveniently located to labor conditions and nearness to the land to be planted. From this beginning has developed a nursery of 27 acres with a production in 1920 of 80,000 four-year-old transplants, and there is under construction the acreage to increase this output to an annual production of 4,000,000 four-year-old transplants.

The land had to be stumped, cultivated and thoroughly cleaned of all debris such as sods, roots, sticks and stones. Although the soil is light and sandy, grading was necesary to insure proper drainage and in laying out and forming the roads and paths, open drains were formed which sucessfully carry off the surplus water. The nursery was broken into three sections, therefore, as the stock is two and two, this permits a rotation crop every two years. In other words, two-thirds of the nursery is in trees, while a soiling crop (buckwheat or field peas) is grown on the other third.

Water, which is an essential factor, is obtained from a small lake lying below the nursery. Here a pump is installed, and by means of a gasoline engine, the water is pumped into an iron tank, 10' x 6', placed upon a tower 25' high. From this tank water is conveyed to all parts of the area through 2" iron pipes laid along the ground and for sprinkling ¾" rubber hose is used.

Seed Beds.

Seed beds are placed in the best drained section of the nursery, are raised three inches above the path, and the surfaces rounded off slightly, so that the centre is about one inch higher than the outer edges. They are made 100' long, 4½' wide, 3" on each side allowed for washing away. After being shaped, the soil is thoroughly moistened to a depth of 4". They are then firmed and smoothed and the seed is sown in drills 4" apart, ½" deep. The seed is covered, rolled and then covered with burlap and kept damp by sprinkling with water until germination takes place.

Care of Seed Beds.

When the seed starts to break ground, the burlap is removed and lath shade screens are supported on frames about 18" above the bed. These screens are so constructed to produce half shade, and remain on the beds until the season's growth is over. In the late Fall the beds are covered with straw, burlap or moss. This serves as a protection against heaving by frost. In the Spring the coverings are removed, leaving the seedlings the same as when covered.

During the second summer the seed beds require very little attention, except for weeding, and they are not covered the following winter.

Transplanting.

At the end of the second year, the seedlings are lifted carefully and are transplanted in nursery rows 10" apart and 3½" apart in the row, to secure strong, well rooted trees for the permanent site. The work begins as soon as the frost is out of the ground, and is completed before new leaders form. In Quebec the season is the month of May. The transplanting is done with a 7' Yale transplant board. The accompanying photographs show this board, the trench made to receive the small seedlings and the system of filling in this trench, thus leaving 24 small trees planted at a time. A gang of twenty-two men, girls and boys transplant 60,000 seedlings per day.

Care of Transplants.

This is confined to cultivation, and for this purpose a small Garden Tractor will be used with special attachments for cultivating 8 rows at a time. The transplants remain in the transplant beds for two years, are then lifted by means of a fork and packed with moss in boxes and transported to the permanent site by motor truck..

Field Planting.

This is planting to the permanent site. The season is short and the planting force is large, consisting of four or five crews, each under a foreman. Each crew is composed of ten gangs; a gang comprises a man to run the planting machine and a boy to load the same and carry plants. A photograph shows the Jenssen planter in operation. In rough places, a shovel is used. The trees are placed at regular intervals, 5" x 5', in rows. To carry this out the first gang is given a straight line, and the second pair start another row 5", opposite the first plant set by the first gang. A man and a boy plant 1,000 to 1,200 trees a day, and with our present spacing 1,740 trees are planted to the acre.

In 1919 and 1920 were planted 1,800,000 trees, and the Company has now over 2,000 acres in plantations.

To meet the demand of the nursery policy outlined above the Company has acquired thirteen square miles of the surrounding land and purchases two or three square miles annually. This land is classified under swamp, brush, cleared and good coniferous reproduction. As soon as the land is obtained work is commenced to put it in shape for planting either by clearing out brush or draining the swamps. Therefore, this work in connection with roadwork allows us to keep our best labor all the year.

Experimental work is being carried out in cuttings, thinnings, draining and planting swamp land. In the plantations the Commission of Conservation, Ottawa, has fifty sample plots.

FORESTRY GRADUATES

Three students were graduated from the Faculty of Forestry of the University of Toronto at the recent Convocation, which took place on 4th June, namely: Messrs. F. H. Horton, H. A. Parker and W. G. Wright. Mr. Horton is employed by a pulp and paper company, Messrs. Parker & Wright, by the Dominion Forestry Branch. Thirty-eight undergraduates have found employment for the summer months. Twenty of these are working for pulp and paper or lumber companies, 10 for the Dominion Forestry Branch, 4 for the Commission of Conservation, 2 for the Ontario Forest Branch, 1 for the Entomological Branch, at Ottawa, and 1 is employed by the Canadian National Railway. Of the 5 other undergraduates 3 were unable to work on account of illness and 2 are engaged in private business affairs. There has been a greater demand for students for sumer work than could be filled.



Yoho Falls (Courtesy Dominion Parks Branch).

Dr. Fernow Receives New Honors

An address by President Falconer of the University of Toronto, in introducing Prof. B. E. Fernow for the degree of LL.D. at Convocation on June 3rd, 1920:

"Those who have known this University for the past thirteen years have recognized Dr. Fernow as one of its distinguished figures. Both in the United States and in Canada he was the pathfinder, and still remains the outstanding authority as to the theory and the practice of the forester's profession. His knowledge of the subject is unrivalled, his labour in spreading its principles by pen and speech has been unceasing, and his success as an organizer unqualified. A well educated gentleman of refined tastes and perfect self-control, Dr. Fernow has won the admiration of his students and his colleagues, and he has our deep sympathy in the impairment of his health, which has been partly caused by his unremitting activity over a long life in extending a profession to which he has most unselfishly devoted himself. This degree will be but a slight expression of the gratitude of the University for his services as first Dean of the Faculty of Forestry."

IMPERIAL FOREST CONFERENCE

The following Canadians prominently connected with Forestry work in this country are at present in the British Isles attending the Imperial Forest Conference representing their respective organizations: Clyde Leavitt, Chief Forester, Commission of Conservation; E. H. Finlayson, Forester, Dominion Forestry Branch; W. B. Stokes, in charge of Exhibits of Timber and Forest Products, London, of the Forest Products' Laboratory, Montreal; Avila Bedard, Assistant Forester, Province of Quebec; Ellwood Wilson, Chief Forester, The Laurentide Company, Grand Mere, Que.; Wm. Kilby, Fire Inspector, Canadian National Railways; and Robson Black, Secretary, Canadian Forestry Association.

BIRDS PROTECT FORESTS

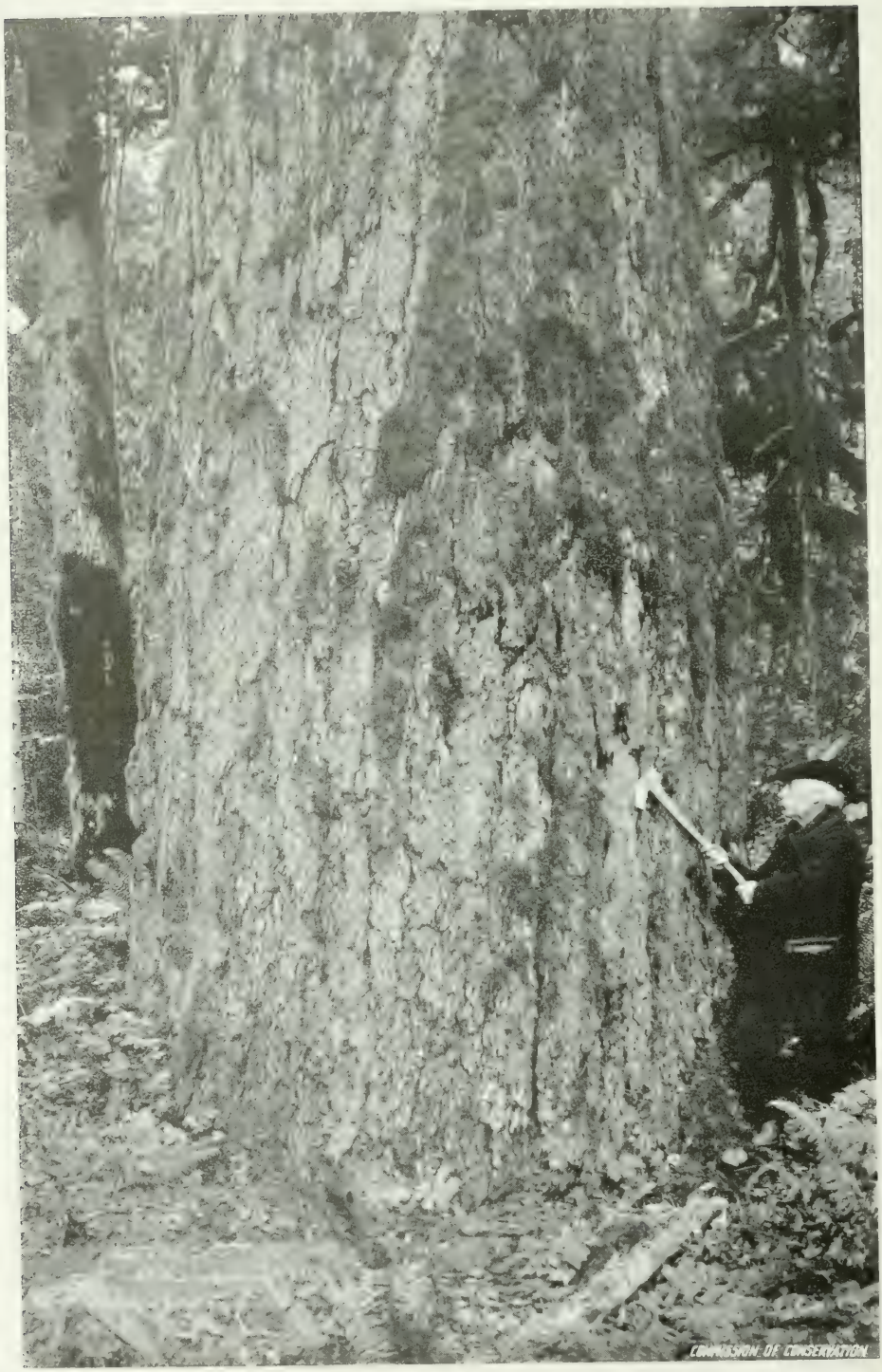
In a recent test case the State of Missouri challenged the constitutional right of the United States to enforce the Migratory Bird Treaty Act. Hon. Mr. Justice Holmes, who delivered the opinion of the U.S. Supreme Court, took a wide vision of modern conditions and requirements. Reciting the objects of the treaty, Justice Holmes said that numerous species of birds, in their annual migrations, traversed many parts of the United States and Canada, that they were of great value as a source of food and in destroying insects injurious to vegetation, but that they were in danger of extermination through lack of adequate protection After dealing with the authoritly vested in Congress to enact the legislation, he said: "The case before us must be considered in the light of our whole experience, and not merely in that of what was said a hundred years ago; we must consider what this country has become . . . Here a national interest of very nearly the first magnitude is involved. It can be protected only by national action in concert with that of another power. The subject matter is only transitorily within the State, and has no permanent habitat herein. But for the treaty and the statue there soon might be no birds for any powers to deal with. We see nothing in the Constitution that compels the Government to sit by while a food supply is cut off and the protectors of our forests and crops are destroyed."—From "Conservation."



Western Yellow Pine, Nicola Valley.



Western Hemlock, Lillooet Lake



Douglas Fir near Chilliwack.

Reclamation of Pennsylvania's Desert

By Gifford Pinchot
Chief Forester, Commonwealth of Pennsylvania.

Pennsylvania was once covered with large, dense, and extremely productive forests. The large have become small, the dense have become open, and the productive have become waste. To-day there are five million acres of idle mountain land in Pennsylvania too rough and rocky for the plow. This is the Pennsylvania desert.

Many agents helped create these vast reaches of idle land, but man played the leading role. It took him but a few generations to remove the original forest, which required many years of Nature's best efforts to build up. Where once stood the best stands of timber in the United States east of Idaho, there remain to-day only wide stretches of bare and barren mountain land. This is our meagre heritage. It has little present value, but many fruitful possibilities, if handled in a constructive way.

To let this land remain idle is an economic crime. It is the duty of Pennsylvania to restore these vast areas of desolation to productive value. This is the work of the Department of Forestry, which began in 1893 as a division of the Department of Agriculture, and is now 27 years old.

The first thing I did upon taking charge was to ask members of the field force to give me a plan for the reorganization of the Department. They did it promptly and well. These recommendations resulted in a complete recasting and marked simplification of the entire organization of the Department, the effect of which shows already, for the morale of the personnel is improving and the output is increasing. This is important, for there is much work ahead and only a few men, little money, and meager equipment available with which to do it.

Four bureaus will handle the executive work. They are Protection, Operation, Silviculture and Lands. In addition, the Forest Academy and the offices of Maintenance and Information have their special work.

The most important duty ahead of the Department is the suppression of forest fires. Every other kind of work must give way to it while the fire season is on. The entire state has been divided into forty fire districts, each in charge of a trained forester who has direct charge of fire wardens, patrolmen, observers, and other employees. Forest protection is needed in every section of the State, for there is no part of the Commonwealth of Pennsylvania without forest land.

We are doing our best to eliminate fire hazards, and to hold responsible all persons, including companies and corporations, who through carelessness or negligence, cause forest fires. The forest fire laws of Pennsylvania are in many respects good and strong, although not yet complete. They will help do the work, but we are trying to get results through friendly co-operation, rather than by costly lawsuits. Public attention has been widely called to the need and value of forest fire prevention, and conferences are being held with forest land owners and representatives of railroads, mining companies, and other organizations interested.

To stop forest fires is a large order, but even a few men who mean business can do a lot to overcome them and to restore a green and growing cover of valuable forest trees upon the barren hillsides of the Keystone State.

A budget for the Department and each individual State forest has been prepared. A re-grouping of State Forests into units of about 50,000 acres each is now under way. The present area in charge of a forester averages about 20,000 acres. This increase will permit a more economical and efficient use of the working force and reduce overhead charges. A new system of inspection is in operation.



On the Way to Yellowhead Pass—(Courtesy Dominion Parks Branch).

which will help to systematize the various forest activities, promote efficiency, and prevent misunderstanding.

As yet, only a good beginning has been made, but the outlook is promising. Much important work will be done at a summer meeting of all State Foresters, which will be held on one of the State Forests. A Committee of Foresters has been appointed to revise the rules and regulations of the Department, and will submit its report at the summer meeting.

Pennsylvania Desert ought to be bought as an investment by the State, for that is the only sure way to reclaim the five million acres which are now producing nothing of value.

Hitherto, the policy of the Department of Forestry has been to consider the purchase of those lands only which were offered for sale by their owners. Now it is proposed to locate by actual investigation on the ground the forest land which is producing nothing, so that when funds become available, the Forest Commission will be ready to proceed to purchase.

The purchase of the Pennsylvania Desert will be an investment, not an expense. The million acres of forest land already purchased by the State at an average price of $2.28 per acre has already more than doubled in value. In the preliminary draft of the new constitution there is a provision which

authorizes bonding the Commonwealth for $25,000,000 for the purchase of such forest land. If, when the time comes, serial bonds are issued for the purpose, the interest, before many years are past, will be carried by the lands bought, and before the whole series has been paid off, the purchase will represent a net gain to the State.

FULL SPEED AHEAD!

The Canadian Forestry Association's Eastern and Western Cars are attracting great crowds. Latest reports from Mr. Archibald Mitchell, in charge of the Western or "Tree Planting Car," show that the enterprise is meeting with great success, and that the farmers are taking a very keen interest in the daily lectures and discussions on tree planting. Mr. Brulé, F.E., Manager of the Southern St. Lawrence Protective Association, is in charge of the Association's Eastern or "Forest Products Exhibit Car," which is touring the Gaspe Peninsula at time of going to press. Mr. Brule reports an average daily attendance of approximately 300 persons. The Eastern Car will next tour the province of New Brunswick under the direction of Mr. G. H. Prince, the Provincial Forester of that Province. Mr. J. A. Doucet, B.A., B.Sc.F., has been recently engaged by the Association to lecture in the Province of Quebec on forest conservation and fire protection. Mr. Doucet is at present visiting eleven towns in the Temiskaming district, and on completion of this tour will visit the Lake St. John district and a number of towns in the vicinity of Grand Mere and the St. Maurice River. Too much praise cannot be given to the different railway companies which are so heartily co-operating in the various educational enterprises of the Association and making it possible for our two cars to visit a widely scattered population.

DEFORESTATION AND BRIDGES

The effect of the removal of the forest cover on the watersheds of our waterways is more widespread than is generally supposed. Not only is the snowfall allowed to melt more quickly and heavy rainfall permitted to reach the streams more rapidly, but in doing so carries with it much lumbering waste and other forest debris. Such material causes serious jams, forming itself into closely-woven masses against the abutments and piers of bridges; the pressure of the water behind these jams carries away the bridges and their approaches, and floods much surrounding territory.

The rapid rise of the streams in response to the precipitate run-off also requires the provision of greater clearance between the abutments of bridges, whereas the tendency has been to reduce the spans, thus emphasizing the possibility of their destruction by freshets. Mr. James W. MacKenzie, Assistant Road Commissioner of Nova Scotia, says:

"It seems to have been the custom for years, as wood became scarce, to narrow up and confine the streams in smaller vents. If it is a fact that the clearing of the country is the cause of the water runing off suddenly in case of heavy downfalls, our bridges must be enlarged to carry the increased streams, and this has been my experience during the last twenty years.

The most destructive summer freshet experienced in the counties of Antigonish and Pictou for the last twenty years, was the freshet of August 2nd, 1908. Some forty-six bridges in Antigonish county and fifty-six in Pictou were carried out, and in some sections every structure in wood was cleared away. I took particular notice that, where the lumber trimmings had been thrown into the stream, the destruction was the greatest.

Steps should be taken to prevent lumbering and mill refuse being washed into the streams, and to remove obstructions in the streams on which jams may form." From Conservation.

BRING BIRDS TO THE PRAIRIES

(*Saskatchewan Farmer.*)

"The vision which we would like every farmer on the prairies to see is a shelter belt a rod wide on the west and north of every square mile of the prairies.

Draw a diagram of a township in sections, and mark it off with such a border of trees and what would it mean? Every mile square would be surrounded with trees. In twenty years these trees would be thirty to forty feet high. Then what?

Let us answer briefly:

1. Hot winds would be checked in their sweep close to the ground, for they would have to rise over the belt of trees, just as a man is checked in racing over a continuous line of hurdles.

2. The moisture that falls as snow would remain on each farm, instead of being drifted into ravines, it may be miles away, never to be returned where it is most neded.

3. Moisture in the form of rain would be attracted and precipitated more evenly over the prairies.

4. Cyclones would find no nesting or birth places.

5. Millions of insectivorous birds would find homes on farms and would aid farmers in fighting insect pests.

6. The beautifying of homes, changing them from what they are to-day—a bare location on the prairies, where men, women and children live, work and sleep to earn a living—to homes with beautiful surroundings that in themselves give rest and contentment, homes that attract, homes that will keep young people on the farm, homes that after young people grow up and go out into the world for themselves, are always remembered as "no place like home."

MAJOR CHAS. G. POWER, M.P. (QUE.), ENDORSES THE ASSOCIATION.

(From Hansard Report of House of Commons.)

Mr. POWER: "I would call attention to an item of $4,000, a grant to the Canadian Forestry Association. I should be the last to ask the Minister to indulge in any extravagance, but it seems to me that if there is one association in the country which deserves well of the country and of the Government it is the Canadian Forestry Association. Since its inception some years ago it has called the attention of the public of Canada to the fact that our forest resources throughout the country were very rapidly diminishing and that if we did not within a very short time take some action we would be in the same position as the United States.

Since this association has taken up its work it has, by means of lectures and an exhibition car, instructed the people throughout the length and breadth of the country, both the children and the grown-ups, many of whom were in sad need of instruction in this respect, in the necessity for forest conservation. The association has lecturers who tour the country at considerable expense. It is true that their members are fairly wealthy, but to my mind this is a work which should be materially helped by the Government of Canada, and I am sorry to see such a small sum as $4,000 provided for it. You could easily raise the amount to $10,000 and do $10,000 worth of good to Canada."

"Mr. MEIGHEN: The amount is the same as in previous years. I believe that the Forestry Association, speaking generally, does very excellent work, and I enthusiastically believe that the work it is undertaking now in the way of public education in the matter of forest conservation is one of great importance. Posibly, if that work develops, we may consider an increased appropriation next year."

THE OAK

Live thy Life,
Young and old,
Like yon oak,
Bright in spring,
Living gold;

Summer rich
Then; and then
Autumn-changed,
Soberer-hued
Gold again.

All his leaves
Fall'n at length,
Look, he stands,
Trunk and bough,
Naked strength.

—Tennyson.



A Unique Fire Warning Notice—(Courtesy Dominion Parks Branch).

Trees vs. Drought

By Prof. George Bryce, LL.D., F.R.S.C.

"It is the expectation of the writer's relations every autumn that we go out to spend a week or two on a visit in the south-eastern corner of Saskatchewan, which we used to know as Assiniboia. That region lying to the south of Moose Mountain has been a favorite district for the growth of horses and cattle and of a fair amount of agriculture. For the last two years the crops have been light on account of the violence of the Dacota Sirocco which swept over from the south of the American boundary line. Lately the writer paid the usual visit and saw the damage done by the serious drought that has visited the district. North of this region is the range of the Moose Mountain or Hills. Moose Mountain still retains its noticeable height, displaying a considerable quantity of trees and shrubbery, and the heights still retain the pretty lakes which make a popular resort.

The writer journeyed north from Kisby, a station on the Canadian Pacific Railway, Regina branch, and saw in the open fields, which are mostly cultivated by good farmers, this year as it was last year, an almost complete failure

of the crops. So great this year is the necessity in this region that a number of farmers have shown a wonderful example of courage. A band of these farmers, having no food for supply of their flocks and herds have gone four hundred miles northward near Prince Albert and have leased a considerable stretch of hay land, and will utilize the C.P.R. coming by way of Regina, to bring plenty for their horses and cattle, and will likely have a surplus for their neighbors in the dry region. This place demands admiration of the grass adventurers of the district.

To see what going north in Eastern Saskatchewan across the Moose Mountain might result, the writer made a visit to Indian Head to see the contrast. Indian Head is north-west of Kisby across country some sixty or seventy miles. Yet in Indian Head there are the two splendid government farms—one for ordinary agriculture, the other for forestry. While south of the Moose Mountain there is this year serious drought, not only the government farms are flourishing with great success, but the ordinary farming in the Indian Head district has a most abundant crop.

We cannot evade the question, why there should be such a contrast from the two points distant from each other as the crow flies only seventy miles apart? No doubt the answer is that the difference arises from:

1. The occurrence of the barrier of Moose Mountain between them.

2. More from intervention of the belts of trees and shrubs that intervene and maintain the moisture in spite of southern winds that blow. The only remedy to meet drought is not only now to chant our song, "Woodman spare that tree," to the reckless tree destroyers that are found in every rural district, but to press upon our local legislatures to make it a misdemeanor to cut down forest sheltering trees as well as brushes and shrubs to any great extent without the permission of a government inspector.

Further, "Arbor Day," which began years ago as a provincial duty to plant trees in town and country, should be renewed and instead of its now being made a mere holiday, to be a day of sacred duty lying at the very base of our prosperity. Let city, town, village and rural municipality unanimously determine to fight and destroy this most dangerous menace, which in some future, not far distant day, may involve our whole province in dismay."

FOREST WASTE

The frequent reports of forest fires in this country make depressing reading. Our forest areas, the envy of other countries, are being depleted not so much by the woodman's axe as by negligence and lack of closer forest supervision.

The great majority of the forest fires are due to carelessness. Every summer many fires are traced to camps It is astonishing with what childish unconcern those travelling through woods, and camping, will throw away lighted matches, and show stupidity as to the care which should be exercised in stamping out camp fires. Carelessness such as this is criminal and should be treated as such. There is something pathetic and terrible in the spectacle of enormous areas of gaunt and blasted trees.

There was never a time when timber was so valuable the world over, and laws safeguarding it cannot be too stringent.

Owing to the dry spell the danger of forest fires has been particularly great of late. The absence of rain makes the carelessness of the camper a still greater menace. Until such time as such offences are promptly punished, and this can only be accomplished by more strict forest supervision, there is little promise of better conditions prevailing.



Scene on Kootenay River, B.C.



Quesnel River, B.C

Private Forestry in Canada

By Clyde Leavitt

Chief Forester, Commission of Conservation

There is a steadily increasing movement toward the employment of trained foresters by private concerns, principally pulp and paper companies. Not less than fourteen such companies in eastern Canada now employ foresters for exploration, mapping, cruising, surveying, inspection of woods operations, forest research, forest nursery work, tree planting, or some combination of these activities. While this is a splendid development and one most promising for the future, it must still be recorded that only to a very limited extent have foresters in private employ yet been used in the actual supervision of woods operations, and that their influence has not yet been felt to any great extent in modifying the methods of conducting such operations with a view to increasing the productiveness of cut-over lands. Developments along these lines must, however, be gradual, but will increase as the forestry profession demonstrates its worth, and with increasing shortage of timber supplies and consequently higher stumpage values.

The reduction of unnecessary waste in logging operations opens a large field to thoroughly practical men with forestry training, and is one in which only a beginning has been made as yet. Adequate action along this line would greatly lengthen the period of operation in virgin supplies of many concerns. Aside from more complete utilization of merchantable material in the trees, by cutting lower stumps and higher up into the tops, it is a well-known fact that in years past great amounts of cut timber have been carelessly left to rot in the woods or have been left stranded in the smaller streams. More careful supervision would correct a great deal of this abuse, though considerable loss by sinkage and stranding in stream-driving seems unavoidable.

Looking After Jobbers

Another field of large possibilities lies in the better control of jobbers' operations, with a view to ensuring the removal of all merchantable material on areas being cut over. There is evidence that, in some cases at least, lack of adequate supervision results in jobbers being given a larger area than they require for the cutting of the number of logs contracted for. The result is that the jobber is likely to pick and choose, taking the best and most accessible trees, and leaving behind a good deal of merchantable material which really should have been taken, but is too small in amount to justify a later operation, and which is likely to be lost through windfall, insects, decay or fire before the undersized timber shall have made sufficient growth to justify another operation.

Among the pulp and paper companies which have undertaken programs of reforestation, the pioneers are the Laurentide Company, Limited, and the Riordon Pulp and Paper Company, both in Quebec. Both these concerns are working toward a planting program of two million trees annually.

During the past year the Abitibi Company has organized a forestry department in connection with its limits in Northern Ontario. In addition to other lines of forestry work, this company has established a forest nursery, with a view to undertaking planting operations.

That the field for private forestry is increasing rapidly is clearly indicated by the increasing number of foresters who are going into the work on a consulting basis. Forest surveys, mapping, cruising and exploration are, for the present, the principal lines open to such men.

Aircraft in Forestry Work.

It was hoped that upon the cessation of the war a considerable amount of aircraft equipment and personnel would be employed in forest patrol and reconnaissance in Canada, but as yet practically the only attempt to use aircraft for this work is that made by the St. Maurice Forest Protective Association in Quebec. The Department of Naval Affairs loaned two seaplanes to this association and an experienced aviator, Lt. Stuart Graham, was engaged to operate them. Unfortunately these machines were not in commission in the St. Maurice valley until the fire season was practically over, and the limited service they were able to render by patrol was not commensurate with the cost of operation. It is generally conceded that these machines, like practically all the types developed for war work, are not suitable for the most efficient and economical service in this field.

In spite of these handicaps it was demonstrated that in a country such as this, where lakes are abundant, hydro-aeroplanes can be used with comparative safety and they offer a splendid means of detecting fires. It is a mistake, however, to claim that aircraft can replace in any great degree the existing ground systems of fire control. They must be supplemented by a considerable amount of ground patrol, telephones and means of transportation, so that men and equipment can be quickly assembled to put out the fires when reported. Planes in some cases can no doubt assist in transportation, but it is frequently impossible to land in the immediate vicinity of a fire. Forest organizations often handle other lines of work in addition to fire protection, for which the maintenance of a ground force is essential.

Aerial Photography

Some very interesting aerial photography was accomplished from these machines in the St. Maurice valley. Photos taken from an altitude of from 3,000 to 5,000 feet showed distinctly the main geographical features such as lakes, streams, roads, etc. Swamps and burns could be distinguished from forested areas, and by comparing the lengths of the shadows, the heights of the trees could in many instances be determined sufficiently at least to tell reproductoin from mature forests. From the photos taken in the autumn, when the hardwood leaves had turned color, the hardwoods could be distinguished from the softwoods and it is claimed that it is possible, after some experience in interpreting these pictures, to distinguish quite satisfactorily the various forest types, for purposes of mapping. To secure estimates of timber stands, a certain amount of supplemental work on the ground by cruisers is essential, to give average contents per acre for the various types of forest. It is confidently believed that excellent results can be secured in this way.

In providing quick transportation to distant points, aircraft can be used to great advantage. Work can be done in a forenoon which with the ordinary means of transportation would take a week to accomplish.

The extent to which aircraft can be used in forest work will depend primarily on the cost of operation, and as yet no satisfactory figures as to this point have been secured.

In Quebec, two of the pulp and paper companies, Price Brothers and the Brown Corporation, have purchased aircraft, primarily for general administrative purposes.

The Air Board of Canada has been presented by the Imperial Government with 100 aircraft of various kinds, including very complete equipment. As a result of the Air Board's operations this year much valuable information will be secured.

It is expected, however, that until a type of machine is developed which provides for greater safety and carrying power, with a smaller fuel consumption, the use of aircraft will not become as general as some of the enthusiasts have predicted. Efforts are being made to develop a type of machine which can land on, as well as

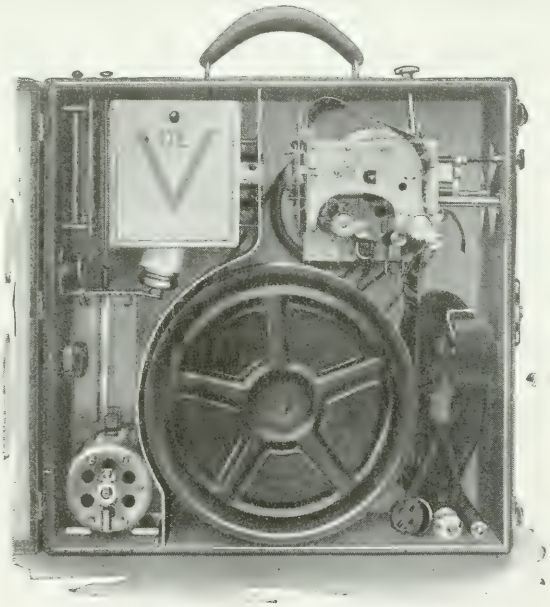
take off from land, water, ice or snow. After seeing the phenomenal development during the war one cannot doubt that in the very near future these objects will be attained, and aircraft will become an established branch of many of our forest services.

It is of interest to note that the United States Air Service has prepared plans for approval by the Government at Washington, which call for the assignment to fire patrol service over western forests of five squadrons of eighteen planes each. Should this plan or any considerable portion of it meet with approval, the results, in conjunction with those which will be secured by the Canadian Air Board, will go far toward determining both the possibilities and limitations of aircraft in forest work, besides furnishing a basis for the determination of costs. The importance of the latter should not be overlooked.

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG



Wood Fall, Manitoba.



Rapids, Manigotogan River, Manitoba.



Timber Treatment



By B. M. Winegar

Assistant General Tie Agent, C. P. R.

It is now generally recognized that the forests of this continent are not inexhaustible. Intensive studies made during the last five years of the stands in the east have revealed that conservation must be practised to insure a continued supply of forest products.

Planted forests in eastern Canada will meet but a small percentage of future demands. Natural reproduction must provide our future forests. Fire protection, which is yearly becoming more efficient, has in view the care of the young growth as well as the matured timber.

In two other ways can the drain on the forests be relieved; first in the use of substitutes, which although decidedly on the increase, have had little appreciable effect on timber demand and prices; and, second, a resonable and scientific handling of those products which are so vital. In the case of the railway tie: timber will always be a necessity. We must have wood; traffic conditions, which are becoming more severe as the weight of operating equipment increases, allows of no substitute.

Timber, though having many virtues, is a decidedly perishable product, especially under conditions in which ties are placed. Contact with the ground hastens decay very rapidly. This decay of wood is caused by parasitic growth of a number of varieties of fungi. In securing nourishment the fungi destroys the wood upon which they feed. The destroying elements are the roots or filaments which enter the walls of the cells and break them down and then work through the timber. The growth of fungi requires air, moisture, food material and a favorable temperature. An antiseptic is necessary to poison the wood-destroying fungi, as the other conditions cannot be modified or controlled. Superficial treatment only is necessary in a great many cases, but where subsequent ruptures expose the unprotected surface such as occur in ties caused by vibration, heaving of track, etc., that is, by mechanical operation on the timber, the treatment must be forced into the wood. Penetration to be effective should be reasonably deep and uniform.

Timber treatment not only increases the life of those species which have been used for ties, but it also makes accessible large bodies of timber otherwise considered unfit for this particular use. We have drawn heavily on the soft wood forests such as Jack Pine, Hemlock and Tamarack. The hardwoods: ash, beech, birch, maple, elm and poplar, with treatment, will now render satisfactory service. Formerly these latter species were not considered as tie material.

Several systems of tie treatment are used in Canada and the United States to-day. Their use largely depends on the weather conditions under which ties are to be laid for service. Creasote oils are now generally considered the most efficient material for timber treatment. They have great value as a germicide, are waterproof, reasonably cheap, and can be obtained readily and in large quantities. They are used straight or in mixture with some of the mineral salts.

Zinc chloride, Sodium flouride and Mercuric chloride, effective germicides, have a high value as preservatives, but on account of bleaching their use alone is generally restricted to climates where there is a precipitation of 20" or less. The "Card," "Allerdyce" and "Wellhouse" processes, which inject a relatively small percentage of oil as filler—use mineral salts as the germicide; their aim is to make timber so treated as effective as that treated with

straight creasote, and, of course, at a much lower cost. Proper seasoning of ties is of great importance in their preservative treatment. Weather conditions in this country, however, are against such complete seasoning as is considered necessary. Steam seasoning generally follows whatever air seasoning can be secured on the piling ground.

Treatment aims to increase the life of the timber from 100 to 300%, depending largely on additional improvements such as the use of tie plates and the elimination of heaving from defective drainage. As treatment increases, the drain on the forests will decrease proportionately.

RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

FIRE HOSE FIRE EXTINGUISHERS
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.

30 St. Francois Xavier St. - - MONTREAL

REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

Mention the Forestry Journal for your identification.

FOREST DESTRUCTION IN FRANCE

The present wholesale destruction of timber, which it is necessary to repair quickly, is not the first France has suffered, and its exceptional gravity arises from the fact that the preceeding one is not yet wholly made up. The great destruction of forests in France during the Napoleonic wars was estimated at 12½ million acres, and it still weighs heavily on the country. The deplorable results of this destruction and of the upsetting of systematic forestry are well known. Much was done to repair the disaster, but the forestry effort of the nineteenth century was insufficient. Although the Dunes and the Landes of Gascony were planted and some afforestation was done in the mountain regions, M. Daubree could only announce an increase of 1½ million acres in the area of forest, or about one-tenth of what was required.





Moraine Lake (Courtesy Dominion Parks Branch).

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Journal for your identification.

Can Timberlands Be Fire-Insured?



By Hon. W. R. Brown

General Loss in Forests Not Greater than other Forms of Property



The idea of insurance on standing timber grew out of observations and records obtained after six years of fire protection in the United States. In the years before adequate fire protection to timberlands by Federal, State and private associations was afforded, there had been a disinclination to consider standing timber as insurable, due to the lack of means for apprehending and extinguishing incipient fires or combatting larger ones. After six years of fire protection carried on by over thirty private associations, fifteen State departments and the Forest Service of the Federal Government, with the co-operative assistance of towns, railroads and other agencies, data was collected and combined to show the character of stands burned over, the extent and frequency of fire occurrence, situations most exposed, and total values destroyed in relation to the total value of all timber in the region.

These data showed the average yearly loss in value over widely separated areas, as the Pacific Northwest, Quebec forest region, New England States, and the Michigan-Wisconsin region, to be below one-half of one per cent annually, which compared favorably with the loss by fire in all other forms of property.

Presuming that the cost of management would also not much exeed one-half of 1 per cent yearly—the usual average cost of doing business in insurance companies — the possibility of giving protection to their woodlands was seriously considered in the winter of 1917 by a group of New Hampshire timberland owners. The various forms of commercial, mutual, and interinsurance organizations were studied, and it was decided that the mutual form was the most desirable to meet the State laws of New Hampshire and give the greatest latitude for organization. A bill was introduced and passed by the New Hampshire Legislature of 1917 to authorize the incorporation of the Timber Lands Mutual Fire Insurance Company of Concord, the first company of its kind organized in the United States, for the purpose of effecting insurance of standing timber against loss and damage by fire, lightning or other destructive elements or cause.

A form of policy was adopted which provided for additional security through the pledging of the policy holder to meet a loss if called on to the amount of twice his annual premium. The company was authorized to write a line in New Hampshire to the extent of $5,000 at 2 per cent annual premium on a mutual basis, it being understood that the policy holders retained their rights and interests in any unexpended balances there might be at the end of the year, when used to build up a reserve. The policy also bound the policy holder by a co-insurance clause to an approximately correct estimate and valuation of his stand to within 10 per cent, so that beyond 110 per cent or under 90 per cent of true value he would be the co-loser with the company in a damage settlement in the proportion that the amount he over or under-valued his stand bore to the actual amount found existent by careful estimate and appraisal made after the fire.

Scottering the Risks

The general principle followed was to scatter the risks widely through-

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks
Montreal."

MONTREAL, QUE.



THE FIRE RANGER'S TOWER——

The Natural Location for a
MARCONI WIRELESS TELEGRAPH
Or Wireless Telephone Outfit.

Wire systems are easily put out of commission by falling trees.

A fire sweeps over your limits and down go your wires—Just when you need them most!

Avoid Risk—Invest in a Modern Communication System.

Wireless Telegraphs and Telephones
Manufactured, Installed and Operated by

THE MARCONI WIRELESS TELEGRAPH COMPANY.
OF CANADA, LIMITED.
11 ST. SACRAMENT STREET
Montreal.

Vancouver
Winnipeg
Toronto

Halifax.
St. John's
Nfld.

Mention the Forestry Journal for your identification.

out the State, to make them small if for full value or take but a partial risk over a large area, and to have these risks at least one-half mile apart in a wooded area or separated by some natural fire line, as a farm, lake, sizable river, clearing, etc. Any policy holder who wished to receive more insurance on his timber than represented by $5,000 could be accommodated by an arrangement made with the Globe-Rutgers Fire Insurance Company of New York, an old-line stock insurance company of size and resources, to take the additional risk at approximately the same rate, but on this insurance there was no return of unused premium at the close of the year.

Estimates and values were determined on the basis of a written statement, filed by the policy holder with the company. If plantations or unmerchantable young growth of natural reproduction, a predetermined valuation per acre was agreed upon as the basis of loss settlement. If second cuttings or old growth, the statement supposedly represented a fair market stumpage estimate and value of the full amount of merchantable and accessible softwoods and hardwoods on the land, large enough to make pulp or lumber, and did not include land values in any way or young growth too small to be merchantable. Final settlement was made on the actual value of the timber destroyed, as found by the company's adjuster, with the co-insurance clause working as described above. In case of a dispute over the salvage value of timber left, the company reserved the right to pay the value of the lot as set in the policy and salvage for its own account. The regular standard policy of insurance authorized in New Hampshire was used, with a rider concerning the special clauses applicable to timber insurance. A higher premium charge was required for a policy taken out only for the dry season, or for carrying over the dry season when canceled at the close of it. During the first season insurance was written to an amount of $276,000, no risk exceeding $5,000 in 57 towns in New Hampshire, Massachusetts, and Vermont among 62 policy holders, 87.4 per cent of which was merchantable timber, 4.2 per cent plantation, and 8.4 per cent young growth. Care was exercised in the acceptance of risks and avoidance was made of land close to railroad rights of way, recent slash, portable mills, picnic grounds, large cities, and other unfavorable environments. Cutting or the establishment of portable mills upon an insured lot vitiated the policy unless special permits for same were secured in advance. During the life of the company, which extended for two years, the largest loss sustained was $600, which occurred in a young plantation completely destroyed.

Due to the war, the solicitation of insurance was given up in 1918 and the company effected reinsurance with the Globe-Rutgers Fire Insurance Company of New York at a rate which left it a small balance for management. At the close of the first year premiums were reduced to 1¾ per cent and a further reduction of ¼ per cent was in contemplation when the company, having established the principle of timberland insurance and not being particularly interested in the commercial aspect of the matter, decided to turn over its policies to the Globe-Rutgers Company, who were willing to assume the same rates and agreements and offered a larger line to the policy holders, adequately secured by capital and reserve. At the final wind-up, the guaranteed capital was returned to the directors with 5 per cent yearly interest for the two years.

A New Profession—Forest Actuary

The profession of forest actuary had necessarily to be created, and the company's manager, S. L. de Carteret, C.E., and his assistant, Victor Beede, M.F., collected considerable data concerning the relative danger in various sites and from various causes, and the losses in old growth, second cuttings and plantations. Old growth proved the best risk, both on account of its resistance to the spread of fire and the usual care that was taken of it, and

on account of the large salvage return possible by prompt logging, if in reasonable proximity to market. Complete loss was rare, the fire commonly did not consume the whole tree, but merely ate into the base, often hardly penetrated the bark higher up the bole. Second cuttings were found to be more dangerous, on account of the large amount of slash commonly present and the prevalence of immature trees that constituted a complete loss when burned. Because of its low value this land was less often adequately protected, but the loss when it burned was correspondingly low. Plantations were the greatest risk, being subject to complete destruction by slight fire. Plantation values per acre being largely labor, it was necessary that they be agreed on in advance between the policy owner and the company. In actual practice in the future varying rates should be charged, based on the relative risk of each particular piece insured, according to actuarial tables which are not now in existence. Such tables could be constructed by combining the accumulated experience gathered by all insurance companies doing this line of business. The profession of timber insurance actuary should be created and at least one such expert maintained as an adjunct to general fire insurance companies, such actuary having previous practical experience as a timber cruiser, estimator, surveyor, operator and trader.

What the Experiment Proved

The following conclusions are based on experience gathered:

(1) A mutual timberland fire insurance company, to be organized safely, should be on a very large scale, with ample funds behind it, and should extend its insurance over wide areas in order to get an average risk. Risks should not be written unless there exists ample protection against fire afforded by State and town or the owner himself, over the area to be insured.

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings — Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

Mention the Forestry Journal for your identification.

(2) The expense of preliminary estimate and valuation of small lots of land is prohibitive in view of the small premium received. With the co-insurance clause inserted it is safe to take the members' own returns as to amounts and value as correct, and when a number of adjacent risks have been secured, they can be passed upon by the manager in one trip rather than many.

(3) A very large capital reserve is required by law to enable a company to obtain a charter to write freely a considerable line in all States and secure the advantage of covering a wide area and the average risk. The National Lumber Manufacturers' Association might possibly do this if general co-operation by large timberland owners could be obtained. Old line commercial insurance companies, however, who have a well-established business and large reserves are in a particularly desirable position to take on this new line of insurance if they distribute their risks wisely, secure sufficient volume, and charge appropriate varying rates based on previously ascertained tables. If it were possible to secure unlimited backing at the start by the creation of a Federal Timberland Insurance Department at Washington as an adjunct of the Forest Service, with the Government's assurance behind it, it is my opinion that an annual premium of one-half of 1 per cent on policies written over all States and on selected risks would more than pay all losses, and if the management was carried on as an integral part of the Forest Service, in connection with its other duties, and little charge made therefor, a sufficiently low annual rate could be offered timberland owners to attract the large as well as the small, and secure the average risk. The effect of insurance on the practice of forestry and the conservative management of timberlands cannot be overestimated.

(4) A standard expenditure for fire protection must be insisted upon absolutely wherever fire insurance is

The FOX Seven Pound Portable Typewriter



A portable machine that will do all that a high-priced typewriter will do, and at the same time light and compact enough to carry easily. Will answer the writing requirements of almost any individual or firm.

Write for Descriptive Circular.

Price in Case
$75.00.

TYPEWRITER DIVISION,

Photographic Stores, Limited

65 SPARKS STREET, OTTAWA, ONT.

Mention the Forestry Journal for your identification.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country

Very Easy Bleaching Sulphite

Spruce, Pine and Hemlock Lumber

Sulphite Screenings

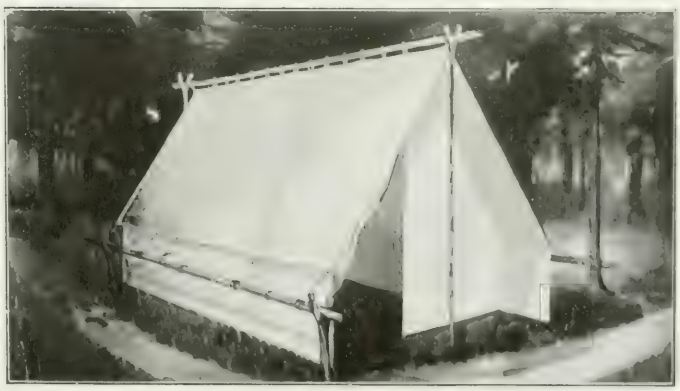
T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

GRANT-HOLDEN-GRAHAM

LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Mention the Forestry Journal for your identification.

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL **Old Town, Maine.**

Mention the Forestry Journal for your identification.

ATTENTION ! **Fire Equipment, Limited**, is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West : : : Montreal.

carried. In New England 1 cent per acre per year seems to be satisfactory; in the Province of Quebec, where vast areas are uninhabited from one-quarter to one-half cent proves sufficient; in the Middle Western States 2 or 3 cents per acre is the practice; and in the far West, where values per acre are high, as much as 5 or 6 cents per acre is often required. New England offers the most security on account of the character of the climate, species and soil, and the farm and other natural barriers that cut the timberland up into blocks and make the danger of a widespread conflagration small. In proportion to values the New England States and associations assess themselves the most for fire protection.

(5) Fire protection might well be made obligatory by law upon all timberland owners within a State, under some State co-operative plan, as the small owner is equally a risk to his large neighbor, but does not commonly contribute. Fire protection should not be done by insurance companies on account of their possible legal liability in case of loss for want of furnishing sufficient protection. Insurance companies should withdraw their insurance if their preventive and protective requirements are not lived up to.

The Public as Partner

(6) The cost of fire protection should be borne by the public as well as the owner, as the causes are often natural, like lightning, and the loss in conflagration affects not only the owner and the industry, but all other industries in the State and serves to depreciate the wealth of the State in general.

(7) Hurricane, insect or fungus devastation should not be included in a policy until statistics sufficient to cover the risk have been gathered.

(8) Comparison of statistics concerning timber loss from fire should be commenced at once by an actuarial board, with members from various sections of the country, to correlate experience gathered, such board to meet either at Washington or at a place designated by the interested fire insurance companies.

Timberland insurance appeals to owners of timberlands one-half to two-thirds grown, who have escaped fire on their timber up to a point where it is near fruition, and who feel they can afford to pay for a few years' insurance even at a relatively high rate until such time as the timber becomes fully developel. They consider they have cashed in a long-awaited investment when they sign an insurance policy, as the danger of complete loss of their investment in unsalvagable immature timber has been removed, and if it matures they will reap its value anyway, and can afford the few years' premium costs. It is doubtful if complete insurance can be carried on plantations, unless the timber values are very great, as the insurance rate eats up a considerable percentage of the growth. Where plantations are necessary for waterworks, windbreaks, etc., it may be wise to keep them protected by insurance.

Timberland insurance appeals to farmers who wish to borrow money on timber lots, bankers universally granting loans more readily if an insurance policy is deposited with them. In this way a large amount of capital can be liquidated and put to work to earn more than the one or one and one-half per cent which it will cost to write the insurance. In other words, an insurance company acts as a bond house for the small timberland owner who cannot afford the cost of regularly bonding his property, and for this reason alone it is of great economic value to the country. Timberland insurance also appeals to owners who wish to leave an estate in trust for their children.

Large timberland owners are attracted by insurance only at a very low rate, as their holdings are commonly so widely distributed as to insure themselves to a certain extent. If large holders could be brought to insure together, the size of their premiums would no doubt enable old line insurance companies to give them a much reduced rate on account of the volume of the business, and because when combined they would represent the average rate over the whole region.

WESTERN FIRE SITUATION
(Dominion Forest Reserves)

Manitoba.—In Manitoba no forest fires occurred during the month of April, owing to the backward spring and the large amount of snow in the woods.

The second and third weeks of May proved a danger period on the Turtle Mountain and Riding Mountain Reserves, but careful patrol prevented any fire loss. Elsewhere in the Province the weather and ground conditions were such that it was still impossible for fires to run. After May 20th the heavy rains and good growth of grass removed all further danger of fire.

Saskatchewan.—Much the same conditions obtained as in Manitoba. The late spring, timely rains and rapid growth of vegetation, together with careful patrol during a short period of great danger covering May 12th to 25th, and the close supervision given to settlers' fires, rendered the fire losses entirely negligible.

Alberta.—In the Rocky Mountains Forest Reserve three to five feet of snow covered the ground dur-

"Canoes that have made Maps and History."

EXPLORERS, TRADERS AND TRAPPERS HAVE KNOWN THE QUALITY OF **LAKEFIELD CANOES** FOR OVER FIFTY YEARS

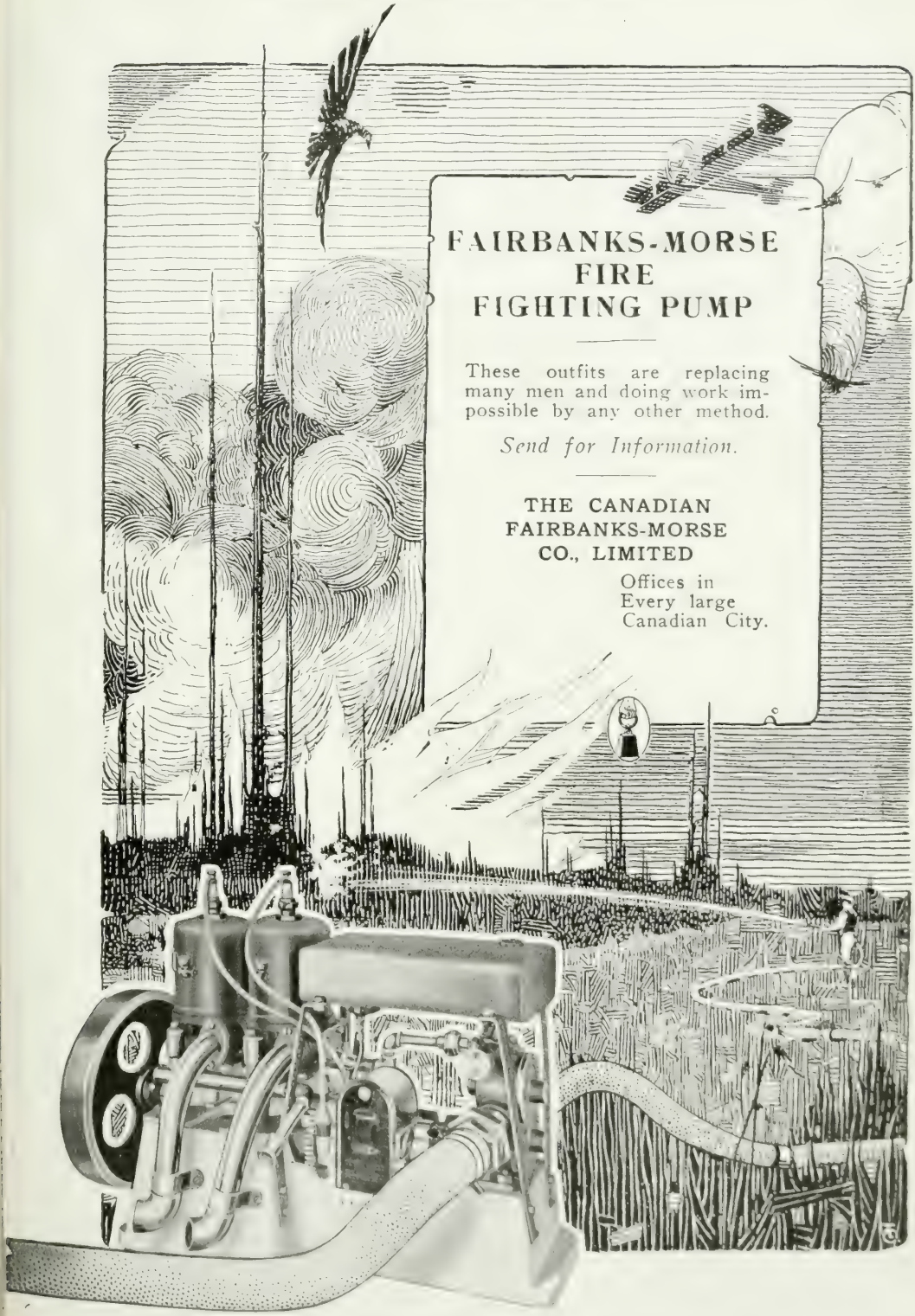
When Canadian forests were in their pristine glory and when the canoe was the chief means of wilderness transportation, THE LAKEFIELD CANOE was being made and sold. We build Canoes and Boats for every known purpose and have several models with different sizes in each for every possible requirement.

Write for Catalogue. It is free.

THE LAKEFIELD CANOE & BOAT CO., LTD.

LAKEFIELD ONTARIO CANADA

Mention the Forestry Journal for your identification.



Mention the Forestry Journal for your identification.

ing April, and the moisture from this source, along with subsequent rains, has prevented any loss from forest fires during the spring. The same welcome immunity occurred in the fire ranging districts, although in the dry part of May numerous small fires were located and extinguished by the ranging force in the Edmonton District.

British Columbia.—Reports so far indicate that no fire losses have occurred on the Forest Reserves in this Province. In the Revelstoke Fire Ranging District during May seven incipient fires were extinguished without loss. In the Coast District the weather was very dry in the first half of May, and some eleven large and fifteen small fires occurred, the total area burned over being about 1,350 acres, mostly in grassland, old burn and slash. The loss is estimated at fifteen cords of shingle bolts and 500 M. B.M. of timber. Good rains towards the end of May precluded further danger of destructive fires.

(Dominion Parks.)

The first quarter of this year shows very satisfactory conditions in all Dominion Parks, the season generally being favorable to fire protection.

There have been 25 fires in all to date, of which 23 were railroad fires, and the cost of extinguishing all fires was $23.70.

The only timber burnt was in Jasper Park, where 3 acres of young reproduction were desroyed and of no commercial value.

The other fires, which were in grassland, occurred both in Jasper and Rocky Mountains Parks.

LUMBERMEN ATTENTION!



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,
BATHURST NEW BRUNSWICK

J

The JOST COMPANY, LTD.
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

WANTED
150 lbs. White Spruce Seed
(Picea Canadensis)
LINCOLN WOOD PULPCO.
Box 923 BANGOR, MAINE

TREES. SHRUBS and SEEDS
HARDY NORTHERN TREE STOCK
EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Mention the Forestry Journal for your identification.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.
Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.
We have assisted in the initial financing and distribution to investors of the following securities which will be quoted on request:

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.
Howard Smith Paper Mills, 8% Pfd. and Participating Stock.
Riordon Pulp & Paper Co., Common (10%) Stock.
Mattagami Pulp & Paper Co., 7% Convertible Debentures.
Wayagamack Pulp & Paper Co., First Mortgage 6 Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

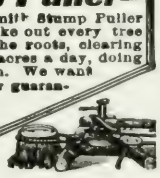
Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.
THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk

The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sts.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA





QUEEN'S UNIVERSITY

KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber and pulpwood limits.

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." Telephone: Main 3281.

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.

Sault Ste. Marie, Canada.

Mention the Forestry Journal for your identification.

IF YOU WANT A CHEW
THAT WILL JUST SUIT
YOU

ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Fraser Companies, Limited.
Donnacona Paper Co., Limited.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities

Corporation Limited

MONTREAL

TORONTO HALIFAX ST. JOHN LONDON, ENG

Mention the Forestry Journal for your identification.

FACULTY OF FORESTRY
SEP 25 1926
UNIVERSITY OF TORONTO

1926
Aug-Sept
15¢



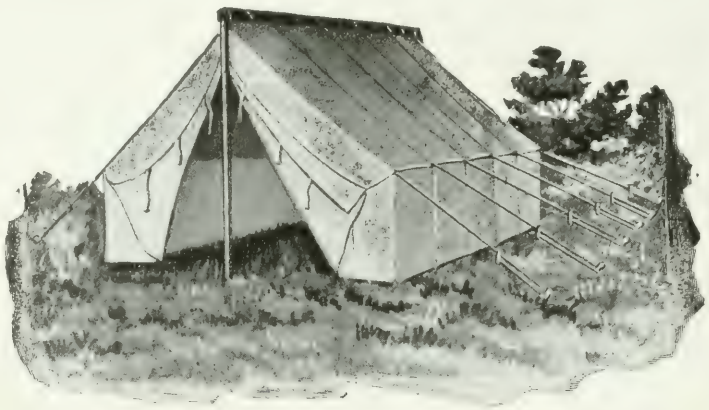
Illustrated Canadian Forestry Magazine

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

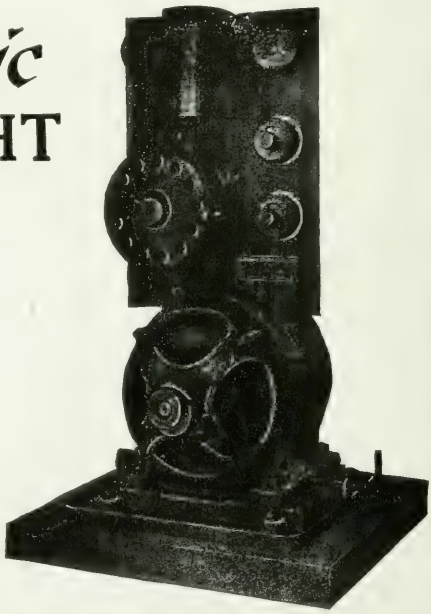
OTTAWA
CANADA
Dept. D.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

VETERAN

motor trucks

Built in Canada

In buying a Truck of the **VETERAN** class your purchase price, although naturally more than the price of an inferior truck, saves you money in the long run.

You do not have to pay for your truck over and over again in maintenance and repairs. The **VETERAN** is a **ONE PRICE TRUCK**.

Eastern Canada Motor Truck Co., Limited

HULL, QUE.

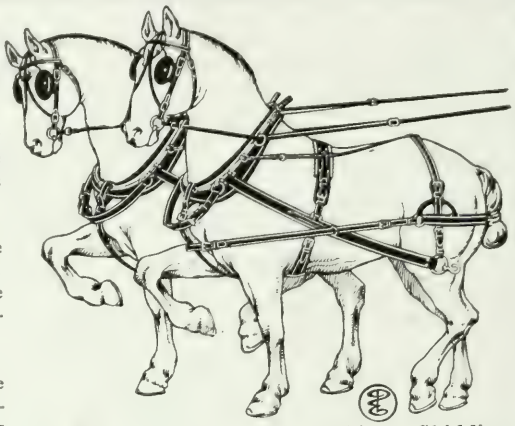
Mention the Forestry Journal for your identification.

Lumbermen

You who appreciate the benefit of having your outfits solid, reliable and dependable will be glad to get acquainted with "Carson Quality" outfits.

All "Carson Quality" articles are made on honor, and they stand the strain. Our lumbermen's harness is made of the best quality oak tanned leather and tested materials—by expert workmen.

In addition to harness we handle horse equipment of all kinds—hand-made cork-faced. collars,. waterproof. clothing. for horse and man. We are also making a fine line of pack sacks at particularly low prices. Ask us for particulars about "Carson Quality" goods.



Our Michigan Skidding and Lumber Harness

Carson Quality

P.S.—We also make trunks, . bags . and travellers' requisites and a full line of shoe findings.

Hugh Carson Co. LIMITED

72 ALBERT ST., OTTAWA, CANADA.

Laurentide Company

LIMITED

GRAND MERE, QUEBEC

MANUFACTURERS OF

Groundwood Pulp — Newsprint Paper

Sulphite Pulp — Cardboard

Mention the Forestry Journal for your identification.

CIRCULATION: 12,000 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Magazine

VOL. XVI. PRINTED AT KINGSTON, CANADA, AUG.-SEPT., 1920. Nos. 8 & 9

With Mr. Mitchell on Our Prairie Car



Are the Western Farmers interested in tree planting? Read this bracing description



Editor's Note:—The Canadian Forestry Association sent to the prairie provinces this year a Tree Planting Car, in charge of Mr. Archibald Mitchell, a well-known Western authority. The car is fitted as a motion picture auditorium, with its own projector and electric generating plant, thus being able to carry on its educational work independent of local limitations. The enterprise has been successful from every point of view. During August and September, the route of the Car will take it over the C.N.R. from Calgary to Saskatoon, thence southward on the C.P.R. into Southern Saskatchewan and Manitoba.

By Archibald Mitchell

We have just about reached the summit of our trip across the Prairie and back, and will be turning our faces eastwards for a few months of work in



Can trees grow in the dry belt of Southern Alberta and Saskatchewan without irrigation? Mr. N. J. Anderson, of Barnwell, Alberta (near Lethbridge), is helping to refute this idea. The shelter-belt shown in the picture is four years old, and stands from 16 to 20 feet high. Growth has been attained in the absence of any irrigation and during the three driest years on record. But Mr. Anderson handled his planting and cultivating intelligently, as you will gather from Mr. Mitchell's article printed in these pages.



He would have gotten better results with irrigation, but this farmer succeeded quite well in establishing trees in Southern Alberta during the three excessively dry years just passed.

Saskatchewan and Manitoba. So far, we have met some five thousand people in meetings in the car and scores beside, singly or in groups, all interested in tree growing on the Prairie in some of its phases. Very rarely indeed have the meetings not begun on time, and often six o'clock has found us still discussing somebody's tree problem after the three o'clock meeting, and many a time the eight o'clock gathering has closed at eleven or half-past.

Interest? There is no end to the interest, people are hungry for tree and plant information. As one of them remarked the other day: "We miss the old Institute days, when we could at least once a year get all our tree troubles cleared up." The questions they ask are both numerous and varied, and range from the depth to sow Caragana seed to what to do with a plantation when the



Soil drifting is a grave problem for farmers in some of the southern prairie districts. Light soil, high winds, and no thick belts to break the force of gales has in some cases blown two sowings of flax seed completely out of the ground in one season, making a third sowing necessary. The photograph shows how the soil drifted through a settler's shelter belt because it was of insufficient density, but even then he saved his fields from extensive damage. For six miles west of him the crops and soil were completely blown away, due to lack of any wind-breaks.

grass has taken possession of it, or "Why is it my house plants don't grow?" "What varieties of apples and crabs would you advise for this country?" and "Why is it the evergreens I transplanted from the hills did not grow?" or "How would you set about planting a shelter belt across the farm?" Some are not easy to answer at first, but usually a few questions are enough to get at the root of the trouble, and we have always managed to find some solution that seemed to fit the matter in hand. It is interesing, too, how one's theories (the knowledge of experience) are confirmed time and again by someone who has reached the same result by following the same processes we have been describing. Such testimony is very valuable, and never fails to impress. It is at the same time very encouraging to the speaker.

Is the Dry Prairie Fatal?

A very striking instance of this occurred at Lethbridge, where Mr. N. J. Anderson, of Barnwell, confirmed all we had said regarding the possibility of growing trees on the Dry Prairie. Some people in the irrigated sections especially are very sceptical as to dry land tree growing, more particularly in the last three or four years, when everything has been so dry, and it was refreshing, to say the least, when Mr. Anderson was able to endorse everything we had been saying. Trees do so well with irrigation, planted even singly, and with very little cultivation afterwards, that the tendency is to expect the dry land trees to succeed in the same way, and with little or no attention afterwards, a mistake which is fatal every time.

Here's a Real Success!

A visit to Mr. Anderson's place on our way to Taber amply bore out everything he had said. His trees were obtained from the Government, the same as anybody else could get, and they were planted in 1917, just at the beginning of the dry years, and yet he had a full stand, nearly every tree growing, many of them 14 feet high now, a splendid example of what can be done in a very short time by carrying out instructions and using a little energy and common sense. On enquiry, it was found he had made a perfect summer fallow preparation, plowed the land deep about the end of May, the year previous to planting, and kept it well tilled all summer. There were no weeds on it. He cultivated to conserve moisture, and consequently was not bothered with weeds getting much of a start. The trees were planted carefully, the soil trodden well down about the roots and cultivation was carried on frequently during the dry summer of '17, the same system of not waiting for the weeds being carried out. The years '18 and '19 were dry, but Mr. Anderson believed in the irrigation of the Cultivator, and persevered, keeping the ground stirred all summer, and the result is those trees have grown to all appearance as well as if the usual rainfall had been taking place the last three years. Fourteen feet high is as good as can be expected in any three years with normal rainfall without irrigation, and is enough to satisfy anybody. The whole plantation is a standing proof of what can be done in tree growing, even in dry years, when correct methods are carried out.

Aiding Town Schemes

Every town or village has its own local little tree problem; sometimes the wrong trees are being used, sometimes they are being injured by a too frequent use of the sprinkler, actually being injured by kindness, and sometimes insect or fungus attacks are doing damage. At every place we try to get through the town before the first meeting, taking in the local tree troubles and successes and securing specimens for the meetings in the car, so that we can speak intelligently on whatever may turn up, and advise accordingly.

We have seen a great deal of damage from soil drift in our travels, and whenever that is mentioned it is not difficult getting people's attention.

Two Crops Blown Out

Mr. Anderson's plantation is a striking example of the advantages of tree belts in checking soil drift. His trees are in three belts, about 33 rods apart, running north and south. Immediately west of the outer one there is a crop of flax which is the result of the third seeding this year, the two previous crops being blown away completely.

For six miles west of him the crops and soil were completely blown away, and yet no drift passed through the third strip to his house and garden. His belts are too narrow for perfect success as self-sustaining plantations on dry land, being only 3 to 6 rows wide. If they had been six rods wide little or no drift would have passed through the first one, and the whole field would have been completely sheltered. The third strip is the widest, consisting of six rows, and counting from the west side, rows of Willow, Russian Poplar, Ash and Maple, Maple and Ash and Ash and Maple being used. The three inner rows were almost completely smothered with the dust bank, five feet deep of it, but yet these trees are all growing through the pile of soil and have made from 2 to 3 feet growth this year, a conclusive answer to the oft-heard doubt that the tree would be destroyed by the soil drift instead of the soil drift being stopped by the trees.

Three other well-treed places were passed on the way to Taber, standing rebukes to every other farm in the vicinity, standing bleak and bare as they were when first settled years ago, and shining monuments of what can be done even in the driest years on the Prairie in the way of tree growing.

Time Lost, Time Gained

During the whole trip we have not heard a man question the fact that trees would help the country, help it in retaining snow in winter and prevent evaporation in summer, afford shelter from the winds and help to keep the land inside the fences.

There is never any doubt about these things, the question is to find the time, and when the method of planting two acres of trees, easily, quickly and well is presented, it leaves them thinking. They see it, and they also see that two or three days taken from the middle of their wheat seeding is not time lost, but only transposed, for the time taken from the middle of wheat seeding, to plant rees, is only transferred to the end of it after all, and the little frost risk they are likely to run from the change will be far more than counter-balanced by the gain resultant from the planting of the trees. Numbers of them came into the country only to sell out after a few years, and put off their tree planting on that account; but many are now beginning to realize they have made a mistake, and that, indeed, unless they plant, they will not be able to sell their land at all. Many more have been so hard pressed to solve the bread and butter question, they have not had time to attend to trees, that is, they thought they had no time, but when it is pointed out that in most cases the bread and butter question is an almost endless chase anyway, and that a week per year spent in planting and caring for a good belt of trees would never be noticed in the annual cycle, they begin to see how much they have missed, both they and their families, socially and financially, by keeping their noses too close to the dollars-and-cents grindstone.

The truth is, the people really are tree hungry, if they would only stop to think about it, but like everything else one does not understand, they are afraid to tackle it. They forget that the planting of a tree belt is, after all, only a short job, but it is a completed job, and the time taken will never be missed out of the year's work.

Telling Wood by its Color

A French scientist asserts that he has devised means of identifying timber by the various reactions on coloring matter it contains and that the idea can be extended so as to prevent deception in imported woods.

From Blind Channel, B.C.

"Enclosed find money order for two dollars to cover subscription to the Canadian Forestry Journal. The Journal is worth twice what it costs."

From a Paper Company President

"I have your Memorandum of the Forestry Association's recent activities. I consider this splendid work."





FIRST TO HUDSON'S BAY BY WING.

Irwin Proctor, with five companions, recently completed a successful return air voyage by seaplane from Toronto to Hudson's Bay by way of Algonquin Park and the Ottawa Valley. The journey was made for a film company, and Mr. Proctor asserts that large bodies of pulpwood were seen...The photographs were taken by Mr. Ernest G. Poole, Chief Fire Inspector at Cochrane, Ontario, to whom the Forestry Magazine is indebted.



Honorable L. A. Taschereau, the new Prime Minister of Quebec, a notable champion of the Forest Conservation cause.

"The Time Has Come"--Premier Taschereau

(A verbatim copy of some striking statements made in an address at Quebec by Provincial Prime Minister.

"First of all a jealous care and rigorous conservation of our natural resources. We have 80,000,000 acres of unleased forests which need fire protection. For some time big white birds have been hovering over them. The hydroplanes have begun their patrol to locate fires at their outset. They shall be supplemented by observation posts fitted up with wireless telegraphy.

"The time has come, it appears to us, to regularize the cutting on limits by fixing a maximum of the annual cut to prevent the destruction of the forests, and a minimum to stop speculation and to assure us a reasonable revenue from the cutting rights. We shall ask lumbermen to prepare their programme of operations to permit us to safeguard the interests of the province by a previous inspection and a constant control of their operations.

"Reforestation should be immediately undertaken and encouraged with energy. We should have no illusions, our forests are not inexhaustible. Forty-five million acres are already under cutting license, and private forests contribute only 5,000 acres.

"I am giving you a few of the plans which are dear to the heart of the Minister of Lands and Forests. Not only will he send young engineers to study forestry science in Europe, but he is thinking of creating a paper school and a school for the cullers and forest rangers.

"The forests have acquired an unheard-of value. You will readily see an anomaly which calls for urgent remedy when you note that a ton of paper, which formerly sold at $40, now calls for $120, that a ton of pulp which was worth $15 is now valued at $90, that the price of a cord of wood has been increased from $5 to $20, and that the Government collects about the same duty as before the rise. Far from us the idea of oppressing this fine industry of pulp and paper, and to ignore the increased cost of production, particularly in recent times. But we are to-day the masters of the market and, without waiting until another product is found to replace wood, we should get out of our forests all the revenue that they are capable of giving. Besides, we have conferred with the wood merchants and manufacturers, and I am pleased to recognize the broad spirit with which they have greeted our representations. How shall we be able to protect their limits, build roads, bridges and reservoirs for them, if they do not do their share?

Another Bill Rendered—Canada Pays



Forest Fires Set by Human Agencies Again Rob the Country of Basic Assets



The forest fire scourge will present the Canadian people with another monster bill for 1920. There are not enough accurate records to compute it at the date of writing, but the adding machine is clicking merrily, and the final red total will overtop the figures of any year since 1916.

Most of this year's forest bonfires were preventible. They started from people. Some were campers who left their cooking fires blazing; some were settlers who while clearing off a patch of land with fire cared nothing if half the countryside were consumed in the same line of flame. Many originated with the railroads, and an inexcusable number from woods' employees. The effect on Canada's reserve of wealth is the same whatever the cause.

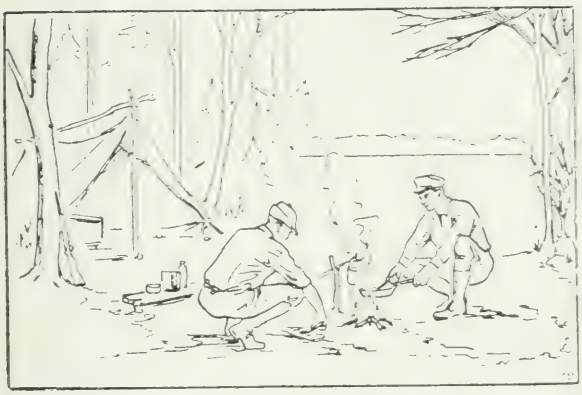
Killing Off Our White Pine

Pine as a commercial wood has passed off the stage of scores of Eastern Canadian counties, and the areas once bearing these precious timber trees are in most cases growing up in valueless hardwoods. Canada's remaining pine stock is gathered up into a relatively small pocket of Western Quebec and Eastern Ontario. Yet with all our knowledge of that fact and of the damaging consequences to many great industries and flourishing towns dependent on pine logs, one big blaze this year cleaned out 15 square miles in a single section of Quebec. Lightning furnished the cause in this particular case, but only in a few areas of Canada is lightning a prime offender.



Part of "The Great Brule," on the headwaters of the Assineau River, Alberta.

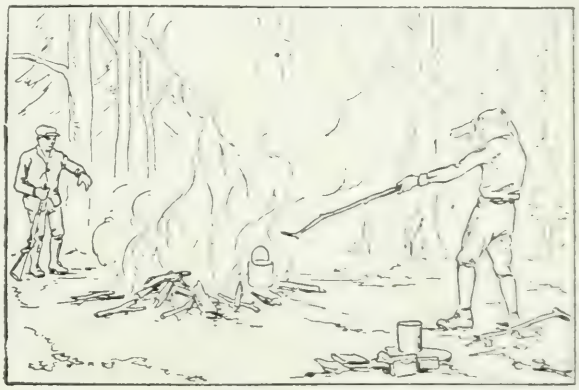
Make Your Camp-Fire Small!



Build your camp fire small. It cooks better. It is far safer for the surrounding woodland. It is more easily extinguished.

Always, please, when finished with your camp fire Put It Out! Put It Dead Out!

This is the genesis of a forest conflagration. The camp fire is too big to approach, too big to cook with, and difficult to extinguish.





How much longer will we tolerate this? Canada "stands the shot" for over 5,000 forest fires, large and small, between spring and autumn, year by year.

There is a prodigious growth of young pine on many of the cut-over areas along the Ottawa River, and future harvests of mature timber are assured if fire can be kept out. The future consequences to industrial establishments dependent upon that young growth of pine should make no bill of expense for ranging or educational work seem excessive.

A good deal is being written by amateur observers as to the timber and pulpwood resources of the region north of the height of land in Ontario and Quebec, but it should not be forgotten that forest fires are annually making such tremendous inroads that the future utility of timber tracts on the northern drainage areas is at best a speculation. When single fires can run for thirty miles, as reported by travellers north of the Transcontinental this season, what hope is there of realizing on such a timber area years from now when its operation becomes commercially feasible?



A badly burned piece of country in Maligne Valley, B.C.

Two forest fires of special violence were those at Ostrom, Ontario, about ninety miles north of Sudbury on the Canadian National, in July. The damage was as follows:

Area fire swept: 25,000 acres.

10,000 acres of young growth burned (chiefly jackpine).

300 acres of commercial timber destroyed.

150,000 saw logs and a saw mill burned.

Damage estimated at $30,000.

At this point were 5,500 acres of slashings, where fire, once started, could not be fought.

At Makwa, 55 miles west of Ostrom, this was the record of one fire in May:

12,000 acres burned, including 500 acres of young growth, 5,000 acres of timber, white pine, jackpine and spruce; the white pine destroyed was equal to 900,000 feet, board measure; the jackpine amounted to 1,500,000 feet, together with 5,000 cords of pulpwood. Camps valued at $5,000 also went up in flame.

While the country has been passing through a bad fire year, it is essential to point out that at no period in our history have forest protection organizations been so thoroughly organized or so well equipped. Many "old timers" point proudly to the days when their books showed very small fire losses in the timber areas, but this may be attributed to one of several causes, or to all of them. The isolation of many timber limits forty years ago was itself an effective protection, but new conditions of land settlement have introduced new population and new fire hazards. Again, the more intensive fire protective organizations of to-day make quicker and more detailed reports concerning forest fires, and in most cases map out the burned area and collect data regarding the damage done.

Lives Lost in Manitoba

About 30,000 forest fires, great and small, occurred in the United States this year. It is probable that Canada has had to suffer from at least 5,000 fires between April and September. There



Neglected fires started by settlers to clear land caused very heavy loss to hundreds of neighbors at Five Fingers, New Brunswick, this year. The main fire, as shown in this picture, is sweeping toward the railway tracks.



St. Quentin, New Brunswick, lost 400,000 of real property in this year's forest fires. This picture shows the railway yard where more than $50,000 worth of ties, poles, shingles and sawn lumber went up in smoke.



Forest fires take a severe toll of property in newly settled districts where loss is hardest to bear. A scene at Five Fingers, New Brunswick, on May 27th, 1920.

have been no holocausts such as the Northern Ontario horror of 1916, but loss of life has been recorded in Northern Manitoba, and shocking loss of property in many sections of the country, notably the burning of St. Quentin, New Brunswick.

Again and again the Canadian Forestry Association has stressed the fact that when a forest burns the people pay. They pay because the private owner of a timber berth makes the smallest of all the profits that come out of a well-operated forest. He also bears the smallest of all the losses involved in the destruction of a forest by fire. This is so, because for every four dollars that come out of a log in the woods, three dollars go to wages and supplies and one goes to government taxes and interest on investment. It is reasonable to assert, likewise, that when a forest burns the loss in employment and railway traffic and supplies greatly exceeds the license holder's loss. One may the more readily agree with this by remembering how a cord and a half of logs worth perhaps $30 at a railroad siding becomes worth $120 when manufactured into a ton of newsprint paper. Growing in the forest, the wood equivalent of the ton of paper would be worth at most a few dollars. The community value of an accessible timber limit, therefore, must be counted by our governments and private citizens in terms of potential employment, potential export trade, new towns and population, railway freight, and public taxes. As a nation we have bromided ourselves with the foolish thought that when a grocery store burns down an insurance company writhes in great pain and that the common folk get off scot free. Similarly, there is a widely-held notion that when a timber limit goes up in smoke, the individual limit holder bears the entire burden. As a matter of hard truth, it is the community that "stands the shot."

What Went Up in One Fire

Only occasionally is it possible to render into graphic terms the icy statistical totals of timber fires. Here, however, are terms graphic enough for anybody; they were embodied in a statement made to the Foresty Magazine by one of the best known lumber firms in the Ottawa Valley:

"Some years ago, a settler who was allowed to locate on the edge of our



Manitoba is fortunate in having as one of its fire guardians Jas. T. Blackford, of Norway House. Mr. Blackford believes in educating all elements of the population to observe every caution while in or near the woods. Here we see the aftermath of a talk to Cross Lake Indians on fire prevention. The audience is promising to extinguish all camp fires before leaving them.

pine limits in Eastern Ontario started a fire on his land in order to clear space for a potato patch. That single fire burned from Mattawa westward towards North Bay and *consumed more pine forests than would keep our big mill running for 56 years.*"

The speaker was one who considers all public statements carefully and his knowledge of that fire was first hand.

A potato patch versus 56 years' supply of pine.

Or a neglected camp fire versus a pulp and paper mill.

Or a tossed-away cigarette versus a million railroad ties.

Or a locomotive smokestack versus a struggling half-insured village.

These are the equations impossible to escape.



At Round Lake, Saskatchewan: A fire burning rapidly in clumps of willow and poplar



A fire-swept jackpine ridge. The trees are all dead, but still rooted in rock crevices. All the soil is consumed and the district transformed from a public asset to a public liability.

The nation that holds great forests holds the key to prosperity. If Canada can retain her forests, Canada need fear no public debt.

A Forest and a Barn

To retain forests, as to retain a wooden barn, means that fire shall be given no point of entry. A simple formula indeed with the barn, where all who approach it have a vital stake in its protection. With the forest unfenced, mostly unwatched, the remedy is not so simple. Consider the problem of the Riordon Company, which controls a timber area as large as Belgium.

Essential as is all the machinery of fire prevention and fire fighting, now in effect, the more comprehensive antidote to forest fires is to undermine the cause, which is human carelessness. Ranger patrol requires to be supplemented by Educational Patrol. The settler whose fires run riot and ruin timber tracts is usually a reasonable sort of man, influenced by intelligent appeals for his co-operation. Thousands of men who start forest fires do so out of a traditional ill-will towards limit holders, and this is often fanned by selfish agitators. Thousands of campers and fishermen and hunters are waiting to learn by experience the extreme peril of carelessness by fire while in the woods, but they are willing to learn in advance if approached from the right angle. This all boils down to a consideration of the value of educational propaganda for the guarding of forests against the common causes of fire.

The Canadian Forestry Association, co-operating with all Government and private agencies, carries on aggressive educational work throughout Canada, aimed at preventing needless destruction of the country's forest resources. The success of these enterprises has received abundant testimony. However, in a forest estate so vast as even one province, intensive propaganda can only be achieved by large expenditures. It is not an exaggeration to say that the total revenues of the Canadian Forestry Association, now about $30,000 a year, could be spent with great public profit in any one of the forested provinces.

THE AUGUST-SEPTEMBER ISSUE

Readers will note that the August and September issues of the Canadian Forestry Magazine have been combined in one number. This was necessitated by such considerations as paper supplies but equally as a means of issuing the magazine henceforth at the beginning of the month instead of at the end. Readers will get the October number during the first week of October, and this arrangement will be maintained in future.—Editor.



A New Body: The Empire Forest Association



One of the most promising developments of the recent Imperial Forestry Conference held at London, England, was the formation of an Empire Forest Association, the specific purpose of which will be "to promote and develop public interest in Forestry throughout the Empire."

The headquarters of the society will be in London, and membership will be open to organizations, firms and individuals interested in forestry or the commercial utilization of timber and other forest products.

The objects as set forth in a preliminary document are:

To create interest in and circulate information relating to forestry amongst all classes in the British Empire.

To bring about better public recognition of the identity of interest between continuous timber supplies and systematic forest management and to spread information relating to the commercial utilization of Empire-grown timbers.



What the burning over of slash-covered ground looks like from the air. A photograph taken by one of the Laurentide ompany's seaplanes of a slash-burning at the Proulx Nurseries, July, 1920.

To form a centre for the Empire for those engaged in forestry, and create a means of communication between the various sections in all parts of the Empire.

The First Committee

An interim committee was chosen, consisting of the following:

Sir John Stirling Maxwell and Lt.-Col. G. L. Courthope, M.P., representing the United Kingdom; Mr. Robson Black, representing Canada; Sir Claude Hill, representing India; Sir Mayson Beeton, representing Newfoundland; and Mr. H. Mackay, representing Australia; with power to add to their numbers.

The formation of such an Association was heartily approved by the Imperial Forestry Conference...While the new body will in no way trespass upon the administrative fields of Government commisions and departments, it undoubtedly will have plenty of scope for constructive activity in giving to existing forestry societies and their thousands of members a definite interest in Imperial needs and opportunities. Of high importance is the fact that the Empire Forest Association will combine promotion of better forestry methods in all parts of the Empire with promotion of inter-Imperial trade in forest products. This will be accomplished not through overlapping any existing agencies or by setting up new machinery, but mainly through a well-planned educational campaign, in which existing educational channels will be utilized. For example, the personal interest of the 11,000 members of the Canadian Forestry Association will be sought through the Forestry Magazine, and similarly in Australia and in the United Kingdom.

Fuller details of the Empire Forest Association will be given in the next issue of this publication.

French Speaker Rallies Support For Forest Protection

It has been the aim of the Canadian Forestry Association to concentrate the services of its field workers in districts where fire prevention propaganda will likely accomplish most good. With this in view, Mr. J. A. Doucet spent July and half of August visiting some districts of the Upper Ottawa, working from Ville Marie through such points as Fabre, St. Placide, Lorrainville, Mont Carmel, Latulippe, Ste. Eugene, Guiges, North Temiskaming, Guerin, Nedelac and St. Isidore. The attendance varied from 150 to 400 each night, which in communities of limited population was gratifying.

Getting away from the limitations of previous years, the Forestry Association has equipped all lecturers with portable electric engines and generators, with the most modern motion picture apparatus and entertaining and instructive films. In some of the places visited, motion pictures were an entire novelty, and the lessons in forest fire prevention were, therefore, the more eagerly absorbed.

The Association acknowledges the great kindness of all parish priests and company officials, who went to much trouble to secure halls and promote publicity.

Mr. Doucet proceeded from Western Quebec to the Lake St. John district, and there covered Hebertville Village, St. Jerome, St. Andre, St. Hedwidge, St. Methode, Normandin, Albanel, Mistassini, Peribonka, La Doree. The many courtesies of Mr. R. L. Seaborne, manager of the Laurentian Forest Protective Association, and his field inspectors, greatly aided Mr. Doucet's trip.

At all places the interest of the public in the forest conservation question was manifestly brisk, and the meetings undoubtedly will result in better public cooperation in prevention of timber fires.

At a recent meeting of the Directors of the Canadian Forestry Association, the question of appointing a permanent French-speaking propagandist was discussed, and will be dealt with more definitely at a future meeting.

Twenty Years of Forest Tree Planting

By Joseph S. Illick
Pennsylvania Department of Forestry



An inspiring story of what aggressive public policies can do in reforesting idle lands



Editor's Note.—Realizing the deep interest all over Canada in the project of replanting with timber trees the enormous areas of idle lands and thus turning them to our economic profit, the Canadian Forestry Magazine asked Professor Joseph S. Illick, in charge of tree planting work throughout Pennsylvania, to tell the story of Pennsylvania's success.

Readers of the Forestry Magazine will find Mr. Illick's article, which is generously illustrated, a real contribution to our knowledge of forest tree planting in Canada.

At least 50 million forest trees have been planted in the State of Pennsylvania during the last twenty years. Forest tree planting began in Pennsylvania in 1728, when John Bartram acquired a tract of land near Philadelphia and planted thereon many different kinds of forest trees. But most of the early planting took place in gardens, groves and parks, on estates, by roadsides, and along waterways.

The real advent of forest tree planting for forestry purposes, however, did not begin until 1899—two years after the State began to acquire land for forestry purposes. The progressive growth of the practice on the State forests is shown in the following table:

Year.	Number of Trees Planted on State Forests.
1899	1,000
1909	738,461
1910	1,092,213
1911	1,663,661
1912	1,890,404
1913	3,164,637
1914	3,393,571
1915	4,315,436
1916	5,492,020
1917	3,595,720
1918	6,033,760
1919	6,132,547
Total since 1899	33,806,338

About 50 different species of native and foreign trees have been planted. The latter, as a rule, were planted in small number and chiefly for experimental purposes. The following table lists all the species, of which more than 50,000 trees have been planted:

Species.	Number of Trees Planted.
White Pine	20,669,172 (61% of total)
Norway Spruce	4,915,563
Scotch Pine	2,971,909
Pitch Pine	1,638,706
Red Pine	1,058,717
European Larch	712,592
Red Oak	395,927
White Ash	381,733
Jack Pine	352,400
Douglas Fir	104,566
Honey Locust	103,610
Sugar Maple	99,114
Black Cherry	64,340
Black Walnut	63,034
American Elm	50,382
Miscellaneous (less than 50,000 each)	218,573
Total	33,806,338

The success of forest tree planting on State Forests was heralded widely across the State and private owners of idle forest land began to inquire earnestly about the feasibility of reforesting their

own denuded holdings. By 1908 the inquiries became so numerous and the appeals for technical help so insistent that it soon became evident that the time was at hand for a definite plan of co-operation between the Department of Forestry and prospective private planters. In response to this rapidly growing public sentiment an Act was passed by the Legislature and approved by the Governor on April 22nd, 1909, permitting the Department of Forestry to grow and distribute *at the cost of production* forest tree seedlings to private planters for the reforesting of woodlands within the State. During the first year (1910) of the workings of this co-operative plan 66,374 small trees were distributed. In 1915, with only five years of co-operative effort, forest authorities realized that a fuller co-operation on the part of the State was fully justified; consequently a new Act was passed and approved in 1915 which authorized the Department of Forestry to grow forest tree seedlings and distribute them to private planters, who are required to pay *only the cost of packing and shipping*.

What the Legislative Acts of 1909 and 1915 did for forest tree planting on private owned forest land of Pennsylvania is shown in the following table:

Year.	Number of Trees Supplied To Private Planters.
1910	66,374
1911	25,360
1912	66,854
1913	47,770
1914	108,685
1915	115,577
1916	1,471,875
1917	1,812,997
1918	2,186,899
1919	3,139,479
Total	9,041,870

The peak of planting by private owners of forest land has not yet been reached in Pennsylvania. The practice is still growing and extending its scope. Its progressive tendency is shown in the fact that only 66,374 trees were planted in 1910, while in 1919 the number was 3,139,479, the latter being 46 times as great as the former. An examination of the foregoing table will also show that more trees were planted during 1919 than during the first seven years of the undertaking (1910 to 1916 inclusive). The total number of applicants has increased from 23 in 1910 to 798 in 1919, the latter being an increase of more than 3,000 per cent.

The average number of trees distributed during 1919 was 3,943, which indicates that the applicants reforested on an average from two to three acres. The smallest order filled called for 500 trees, and the largest embraced 180,000 trees. This shows that both small and large holders of woodlands are carrying on reforestation projects. The small owner as a rule is filling up odd corners, waste places and incompletely stocked woodlots while the large holders are reforesting entire denuded mountain slopes, particularly those protecting watersheds.



A JOB WELL DONE.

No waste nor debris. Stumps cut low, everything is being used and the brush piled for burning. Area will be planted. A photograph taken in Saxony.



THE CLEARFIELD NURSERY (PENNSYLVANIA)
Produced over 9 million trees for $12,500. Note overhead (Skinner) watering system installed in 1915 at a total cost of $1,306.19.

Forest tree planting is no longer looked upon as a mere pastime, but is now regarded as a real business. But just as is the case in all new lines of work, so in the field of forest tree planting, there is yet much to be learned. Private planters are looking to the Department of Forestry to develop satisfactory and economical planting methods, and make the conclusions available to them. If twenty years of forest tree planting has revealed anything it has shown conclusively that while the practice may appear simple, yet it is beset with many difficulties and numerous technical problems. It would not be possible to discuss all the important problems of the last two decades in a short article, but a few will be outlined and discussed briefly.

Location of Tree Nurseries.

Many factors influence the location of forest tree nurseries. Unfortunately the factors which make themselves felt in the later maintenance of a nursery may not be evident at the time of the selection of the nursery site. I am informed



A devastated area in need of planting. This land once held a fine stock of timber, as shown by the number of stumps indicated by the black spots in the photograph.



What may be expected of Norway Spruce on favorable sites. This stand was not planted but reproduced naturally.

that some of the Canadian provinces and numerous pulp companies are establishing or contemplating the establishment of nurseries, and it may, therefore, be of value to brief the Pennsylvania experience along this line of reforestation.

A sandy loam soil meets most requirements for nursery stock production, but one should not be too insistent upon this factor, for much has already been accomplished in the way of soil modification. The hard clay soil in the Mont Alto nursery, located in Southern Pennsylvania, has been so amended by the use of charcoal braise that what was formerly regarded as an impossible soil for the raising of coniferous seedlings is now producing choice planting stock at a reasonable cost. This, however, does not imply that any kind of soil may be selected, but that soil conditions may have to give way in part to other factors. A level site is satisfactory in case of light sandy soil, but a gentle slope is



A plantation of Jack Pine.

generally preferable, for it permits of proper drainage.

The most desirable aspect for a nursery depends upon the latitude and altitude. Eastern and southern aspects are best in cold regions, while northern and western are best in temperate regions. Latitude and altitude are, as a rule, of more importance than slope and aspect. The Mont Alto nursery opens up at least two weeks, and in some cases three weeks, earlier in spring than the nurseries located in the northern part of the State. It is able to supply the planting stock when it is really needed for successful spring planting, while the planting material from the nurseries in the extreme northern part of the State becomes available invariably too late to get the best planting results. Hence, the Pennsylvania experience indicates that nurseries should be so located that they will be in a condition to yield their stock for early spring planting.

The Supply of Water

An adequate water supply is an absolute essential for the production of vigorous and healthy nursery stock. If possible, a nursery should be so located that a gravity water system may be installed which will supply sufficient water for all nursery purposes. The introduction of watering systems into all the large nurseries operated by the Pennsylvania Department of Forestry has made a striking improvement on the nursery output. Small seedlings may exist in the nursery beds during the drought periods of summer months without an artificial sprinkling with water, but they cannot thrive and become vigorous under such unfavorable conditions. A satisfactory water system was installed in the Clearfield nursery in 1915 at a total cost of $1, 306.19.

The two factors which have been overlooked in the location of some existing nurseries are accessibility and labor supply. These factors are not so evident at the time a nursery is established and may not become apparent until after the nursery has been so enlarged and developed that its handling requires many men and much material. These are, however, very important determining factors, and since the successful operation of a nursery implies much work intermittently during the spring and summer months they should be located near or amidst an ample labor supply. Three of the large nurseries now operated by the Pennsylvania Department of Forestry may be abandoned because of their inaccesibility and inadequate labor supply. Plans are now in progress to establish forest tree nurseries near penal and other state institutions, which will be able to supply all necessary labor whenever it is needed.

Cost of Operating a Nursery.

Many factors influence the cost of operating a nursery. But in spite of all these factors the one striking fact about nursery production is the low cost at which forest tree seedlings and transplants may be grown. The Clearfield nursery, located on a high plateau about 10 miles from the city of Clearfield, has been handled on an unusually economic basis. The total cost of all operations by years is shown in the following table:

		Trees Shiped.
1911	$ 150.55	———
1912	192.91	———
1913	426.94	16,000
1914	756.02	265,000
1915	1,685.16	476,000
1916	2,195.14	1,314,515
1917	1,987.16	1,830,550
1918	2,124.42	3,306,540
(Oct. 1, 1919) 1919	1,676,43	1,952,910
Installation of Water System (1914-1915)	1,306.19	
Total	$12,500.92	9,162,915

The foregoing table shows that the average cost of production from 1911 to 1919 was $1.36 per thousand trees. This figure is low, but it includes all expenditures, even the transportation of the nursery stock to shipping points, and may be attributed to extremely favorable nursery production conditions. It is, however, essential to mention that most of the nursery stock consisted of two-year-old seedlings, which have to date given satisfactory and economic results.

Nursery Stock Grading.

Forest tree seedlings and transplants, when lifted from the nursery beds show a wide variation in size, appearance,



Plantations of Northern Jack Pine (left) and Chinese Larch (right) when eight years old. (Pensylvannia)

form, stockiness, weight and volume. Some method of grading is imperative under such conditions. An accompanying illustration shows the wide range in size of three-year-old Norway Spruce seedlings. This illustration does not show an unusual range in size and form, but presents a condition which usually exists in densely stocked beds.

In order to ascertain more accurately the degree of variation a study was made of three-year White Pine seedlings

with an average of 7,000 trees per 100 square feet of nursery bed surface. The trees were separated into the three following grades:

Grade I.—Large and thrifty.

Grade II.—Medium.

Grade III.—Small and weak (discards).

After being graded the trees were tied up in bundles of fifty each. A comparative study was then made of the three grades on the basis of size, weight and volume, and the results follow:

	I. Grade	II. Grade	III. Grade
Total height (inches..	14.0	10.5	4.0
Length of roots (inches)	5.0	3.8	1.8
Weight per bundle (ounces)	13.8	5.0	2.0
Volume per bundle (cubic inches)	274.0	145.0	55.0

Whether or not to grade forest tree seedlings does not seem to be a question any longer. The time seems to be at hand and good management recommends that all nursery stock should be carefully sorted and classified.

The big question, however, seems to be what to do with grade III. seedlings. Some nurserymen entertain hopes for these underlings, while others protest against their resetting in the nursery. The former claim that the trees are inherently strong but have been unfavorably situated, while the latter insist that they possess inherent weaknesses and defects. In order to throw some light on this unsettled subject over 1000,000 small trees of different species, generally classified as culls, were transplanted in the nurseries. Their development is being watched in both the transplant beds in the nurseries and in plantations. The results are not yet conclusive, but indicate strongly that trees, such as the three small ones at the right of the accompanying illustration, are *not fit to transplant*. They are weaklings, and in many instances have been suppressed beyond recovery.



WHY NURSERY STOCK SHOULD BE GRADED

All the trees are three-year old Norway Spruce taken from the same bed. The three small trees on the right are culls. They should be discarded, for they have been suppressed beyond recovery.

Source of Seed Supply

Too little attention has been given to the source of the seed supply, which has thus far been used in the propagation of nursery stock. The experiments of European foresters along this line of inquiry show conclusively that good nursery management always requires a thorough knowledge not only of the locality from which seed of different species is procured, but also full particulars about the seed trees themselves.

The shortcomings of former laxity on this phase of seedling production are now becoming evident in some of the older plantations in Pennsylvania. Not all undesirable features which are transmitted through seeds become evident in the seedling or sapling stage of a tree's life, but turn up later on. It seems to follow that extra effort should be put forth to get the best possible seed for use in nursery work. Only seed, the full history of which is known, should be used. Other things being equal, it may be most advantageous to collect seeds locally from known seed trees, rather than to depend upon and take a chance on foreign or other distant supplies.

When to Sow Seeds

Much has been written and more has been said about spring and fall sowing of seed in nursery beds. The Pennsylvania experiments show conclusively that fall sowing of seeds, particularly of coniferous species, gives far superior results to spring sowing. Fall is Nature's time to sow, and what is far more important, early spring is Nature's best time for germination and growth. If the seed is not sowed until spring—and it is usually deferred until after the shipping rush is over—then the growth takes place during an abnormally late period for growth.

One-year-old white pine seedlings raised from fall sown seed in the Mont Alto nursery were fully 35 per cent. superior to those grown from spring sown seed. The advantage of fall sowing also suggests the local collection of tree seed, for so often the seed is not available for fall planting if procured from distant places.

Where to Plant

Another Pennsylvania experience is worthy of consideration. It pertains to the planting of cut-over and burnt-over areas. Immediately after vast areas were cut-over and then burnt-over repeatedly, they appeared to be completely devoid of any woody growth of value. Miles of mountain slopes seemed to be without any trace of tree growth. Then, the best informed and most widely experienced foresters agreed that planting was the only available means of restoring these vast unproductive deserts. But the unexpected has happened in many places. Time has shown that nature works in wonderous ways, and that if fires are kept out of our forests there will appear upon our hillsides a fair growth of valuable forest trees. It is quite probable that the conclusions about natural forest replacement in the early days of forestry were based upon past experiences, when fires occurred frequently and did not give nature a chance to show its power.

Restocking Idle Lands

To date almost 23,000 acres have been planted on the State Forests of Pennsylvania, upon sites ranging from abandoned fields, waste places, burned areas, lumbered tracts, Scrub Oak barrens and Fire Cherry and Aspen covered areas, to the underplanting of mature stands. The 1,200 separate plantations established in Pennsylvania during the past twenty years show that planting may be done successfully and economically, and that plantations are relatively safer from fire than other forest areas because of the interest the public takes in planted trees and the value people place upon them. But great care should be exercised in selecting planting sites, for planting should only supplement natural forest replacement and not work counter to it. In order that planting may be done judiciously the subject of natural forest succession on different sites and in different regions should be worked out thoroughly before planting is attempted. For only then, will it be possible to know what areas should be planted and where it is reasonable to expect a satisfactory natural growth. It is now clear that nature will do more to restore

a forest growth on cut-over and burnt-over areas than was formerly anticipated. Consequently, the extent and methods of future planting must be adapted to this new point of view, which will surely hold as forest protection improves.

Mr. Hansson's Promotion.

Mr. Arnold Hansson, a well-known Canadian Forester, has received the appointment of Chief Forest Inspector of the New Zealand Forestry Department, under Mr. L. M. Ellis, formerly of the Forestry Department of the Canadian Pacific Railway.

Mr. Hansson is a Norwegian by birth, but some time ago became a British subject. He received his B.A. and F.E. degrees from Kristiana University, Norway, and Master of Forestry from Yale University. He has had extended experience in forest work throughout the United States and in Canada. After several years with the Laurentide Company at Grand Mere, Quebec, Mr. Hansson entered into private work as a consulting forest engineer with headquarters at Montreal. In this capacity he was retained by the Abitibi Power and Paper Company to conduct special work in connection with their forests. An excellent war record with the Canadian forces is another of Mr. Hansson's distinctions; two years he spent in active service.

A FREE BOOK FOR YOU!

"Tree Planting on the Prairies," is an excellent book of 60 pages, written by Norman M. Ross, B.S.A., Bachelor of Forestry, Chief of the Tree Planting Division, and published by the Dominion Forestry Branch.

By courtesy of Mr. R. H. Campbell, Director of Forestry, a copy of the book, which is well illustrated, non-technical, and comprehensive, will be sent to all members of the Canadian Forestry Association in the prairie provinces who are personally interested in tree planting. There is no charge of any sort. Send us your name and address and "Tree Planting on the Prairies" will go to you by return mail.

The book is now in its seventh edition, and should be in the hands of every prairie tree planter.

Fire Propaganda

An advertisement inserted in the Cowichan Leader, B.C., by the Genoa Bay Lumber Co.

FOREST FIRES ROB YOU AND YOUR CHILDREN!

TREAT EVERY FIRE, HOWEVER SMALL AS YOUR PERSONAL ENEMY AND PUT IT OUT OF EXISTENCE!

PUT OUT YOUR CAMP FIRES. NEVER TOSS AWAY A LIGHTED CIGARETTE OR CIGAR. BE CAREFUL! A BURNT FOREST CANNOT BE REPLACED

A live forest is the source of employment for hundreds.

A dead forest drives out population.

This advertisement inserted in the interests of forest protection by Genoa Bay Lumber Co., Ltd.

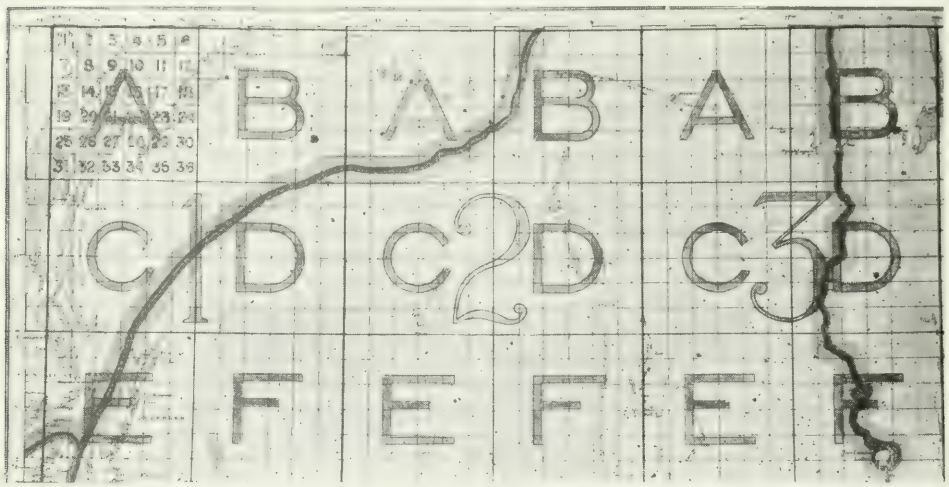


Air Maps For Flying Patrols



How Aerial Rangers Will Wireless Information to Land Stations





In prefacing this article, it may be stated that the following method of map squaring has been adopted by the Forestry Branch, Provincial Government, Quebec, Forest Fire Protection Associations, Quebec, and several large paper and lumber companies who operate aerial surveys and fire patrols of their respective timber limits.

Maps to be used are standard topographical maps, scale 500.00 or 7.8 miles to 1 inch. These maps can be obtained from the Department of Interior at Ottawa, and are published in sheets, which can, of course, be joined up to make one large map of any given territory, and each sheet is given a distinctive reference number. Key to these sheet numbers can also be obtained at Ottawa. To proceed with the actual squaring of these each sheet is divided into 9 squares, every degree of latied into 9 squares, every degree of latitude and longitude forming a square, and numbered from top left-hand corner 1 to 9. Each of these 9 squares is subdivided into 6 squares, which are lettered "A" to "F"; the sheet is now divided into a total of 54 squares.

Proceeding along the same lines, in the process of reduction, each of the squares lettered "A" to "F" is divided into 36 squares, and numbered from top left-hand corner 1 to 36. Again, using the same method of reduction, the last mentioned squares are divided into 4 and lettered a. b. c. d. in small letters. The final reduction of squares is arrived at by dividing each of the latter squares a. b. c. d. into 10,, ,but as the squares are not very small, graduations of 10ths are placed on two sides of the squares, these graduations serving as a scale or protractor applicable to any square. It is just a matter of measuring latitudinally and longitudinally to any given

point in square to locate same on map.

It may be here mentioned that care must be taken when squaring maps, to divide each square separately in order to follow curvature and variation of latitudinal and longitudinal lines. The accompanying photograph will serve to illustrate the method more clearly.

Suppose an aerial patrol, in reporting an outbreak of fire, sends in by wireless to the nearest station a message as follows:—"Fire 34-1a-2b-5-4, you simply look up sheet 34, square 1a, 2b, scale latitudinally 5 graduations and longitudinally 4 graduations pin point the intersection of these lines, and you have as near the exact location as possible. Of course, it will be readily understood that fire location will be more easily discovered by airmen.

By aerial photography, as used in mapping out the war zone in France and Belgium, mosaic maps will be made, and will prove invaluable in correcting positions of lakes, rivers, etc., in unsurveyed territories, but the whole operation depends upon accurate squaring of maps not only as a guide to the airmen, but in compiling and joining up of mosaic maps. This method of making maps etc., is as yet in its experimental stage in regard to Canada, but there seems to be no reason why it cannot be made a success, given the right men to do this work. However, this season, it is hoped, will produce results which will be awaited with great interest by many private companies.

Reverting to fire patrol by airplane, immediately a fire is reported by the airman and map-location given, the Fire Protection Association is notified; they record same and despatch men to fight the fire. Direction of such forest fires should be observed and reported on from time to time, and fire fighters guided as to best means to combat same.

Conventional signs denoting location of the air harbour, aerodromes, supply stations, etc., will be marked on the mosaic maps as soon as same are definitely located.

Why Our Hardwoods Are Not Used For Best Furniture

Readers of the Canadian Forestry Magazine have frequently inquired why there is not a better market for Canadian hardwoods in furniture manufacture. The question was placed before Mr. J. R. Shorey, General Manager of the Canada Furniture Manufacturers, Limited, Woodstock, Ontario, and the following is his most interesting reply:

"Birch is really the only Canadian hardwood that can be utilized in the manufacture of better grade furniture. The writer is quite well aware that the quantity of standing white birch in Canada is very large. Unfortunately, as it will not float, it is inaccessible. At present the market price of birch lumber is very high, owing to excessive demand in the United States for birch for interior trim.

"We, as furniture manufacturers, can buy gumwood in the Southern States and bring it into Canada and utilize it in the manufacture of furniture at a less price than we can buy the native white birch for, and taking it all in all, it is a preferable wood, because it is easier to work and susceptible to various finishes, whereas birch can only be satisfactorily finished in the natural or mahogany finishes.

"Birch is a strong and reliable wood, and is really the only furniture wood that is produced in Canada. Maple, elm and beech are used for the manufacture of low grades of furniture.

"There is no high grade furniture made out of birch. If you would make a piece of furniture out of birch and put a lot of work on it, you would not sell it in competition with mahogany and walnut.

"CANADA FURNITURE MANUFACTURERS, LTD.,

"J. R. Shorey,

"Managing Director."

A Canadian Forester's Training



By Dr. C. D. Howe, Acting Dean, Faculty of Forestry, University of Toronto.

The final two years of his college course treat the forest as a productive organization



For the first two years of a course in forestry, the student for the most part considers trees separately as individual organizations, but in the second two years he is taught to look upon trees, both in regard to their life history and their economic relations, collectively as stands, types, forests. Just as the town is not merely an organization of people, so the forest is not merely a collection of trees, but like the town is a community, an organization dependent for its development and growth upon certain external conditions and upon certain internal conditions of its own making. Indeed, the simile may go a step farther, for in a town the organization, the structure remains intact, but the component individuals are constantly changing, and so it is with the forest; the forest is always a forest, unless destroyed by some catastrophe—but the individuals are slowly but constantly shifting in time and in space. Because men can comprehend the laws and conditions which bring about these changes in the forest, we have the profession of forestry, since forestry is the fashioning, the moulding of a community of living trees to the needs of man, the application of brain power to the economic production of wood. Man has already applied his intelligence to the energy of lightning and falling water and directed it into economic channels, resulting in enormously increased wealth, so man can apply his intelligence to the energy of nature as expressed in the growing forest and direct it into economic channels, and it would result in enormously increased wealth for our country. The possibilities in Canada are almost unlimited, and the results would be glorious—and profitable.

Science in Forest Control

This is the point of view in regard to the forest presented to the students during the last two years of their course, and they are shown in the forest as well as in the class room how man can control and improve the forest by his knowledge of the laws of its growth, health and hygiene. For example, in reference to these laws, the students are taught how a forest cover influences the amount of light that gets through to the ground, how some trees can grow in the shade of their neighbors and others cannot. In fact, the light relation is the most important factor in determining the composition of a forest, and it is the forester's most effective tool. The students are also introduced to the mysterious cycle of forest growth and soil fertility. The forest feeds the soil by the decay of its leaves and wood. The products of decay of one year or a group of years contribute to the support of the forest life of the following year or group of years. The previous generation gives up its life that the present generation may live.

Soil and Light Factors

Light and soil fertility then are the magic keys that unlock the secret chamber wherein is contained the knowledge which man uses to fashion the forest to his wishes. The equipoise between light exposure and soil fertility on one side and forest growth on the other is extremely delicate. Minor disturbances and adjustments are constantly taking place under natural conditions, but the balance suffers great distortion under the usual logging operations and still more in the case of fire. This explains why the character of the forest usually changes and may pass through several

stages occupying several hundred years before the original forest comes back after severe cutting operations and especially after fires, and this is the fundamental reason that logging operations must be directed with intelligence and technical knowledge if our forests are to be kept continuously productive in terms of valuable species, and the reason, too, that adequate fire protection is absolutely essential to any plans for continuous supply of timber.

Woods Experience

In the third year also especial attention is given to the economic and industrial aspects of the forest, in particular the methods of converting the forests of the country into current wealth. The various steps in the creation of wealth by the application of labor to the forest resources are followed from the cutting of the tree to the production of paper or of a shoelast, or whatever the final product may be. Forest labor is discussed, its character, length of employment and methods of payment, together with workman's compensation acts. The students come in contact with the tools commonly used in bushwork. The advantages of the various types of axes and saws are demonstrated by actual use. The methods of felling and logmaking and the organization of crews are studied in contact with such work. The organization and equipment of a logging camp are explained and later the students learn to appreciate certain characteristics of the average bunkhouse by living in one for several weeks.. The students learn how logdecks are made and how the logs are taken down to the landings for transport by rail or water. They learn the relative costs and advantages of aerial tramways, forest railroads, river driving and rafting and the applicability of the various types of transport to the mill to the different forest regions of the country.

Learning the Markets

The methods of manufacture and use of the various forest products follow the above as a natural sequence. Here the object is not only to give the forestry student an intimate knowledge of the final markets and uses of Canadian woods, but also to give him an understanding of the various factors that enter into the cost of production. The students are required to visit and make reports upon the organization, equipment and production of saw mills, the grading and piling of lumber, upon the manufacture of cross ties, poles, posts and piling, of flooring and siding, shingles and laths; upon the production of cooperage, veneers, boxes, matches, excelsior and various wooden-ware products. They are required to give special study to the rapidly developing wood pulp and paper industry. The processes of manufacture of mechanical and chemical pulp and their conversion into various grades of paper are studied in detail.

The Function of Forestry

Unless the tearing down processes are equalled or exceeded in volume by the building up processes, life will cease, and so it is with the forest unless wood material equivalent in amount to the enormous quantities removed each year in the form of lumber and pulpwood, is replaced each year by new growth, the forest will cease—at least as a commercial asset. To recuperate, to regenerate, to restore is the function of the forester. His greatest and most important work is through intelligent direction of cutting and logging operations to replace the annual loss through the agency of the axe and disease, windfall and fire in the forests which nature has already created free of charge. A part of his work, however, is to create forests anew on worn out farm lands and on areas where forests have been completely destroyed by repeated fires. Forestry students are thoroughly prepared for this kind of work.. They learn about the adaptability of different species for planting under the different climatic and soil conditions in the various parts of the country. They are taught methods of preparing the nursery, raising and caring for the young trees. They learn the different practices in field planting. At the completion of the subject, their book knowledge is reinforced by a week or ten days of actual work in the Ontario provincial nurseries.



Can the prairie produce trees? Notice this beautiful effect at Brandon, Manitoba, showing a mixture of evergreens and hardwoods. Is not this an improvement on a bare wind-swept plain?

"Do Not Use Less Timber, Grow More!"

From a Public Statement by Col. Wm. B. Greeley, Chief Forester of the United States.

Many of us who served in France were able to see at first hand the conditions of life and industry in a country where population has crowded close upon natural resources, where for the masses living has become close and hard, and, even to maintain standards of comfort far below what the average American demands, a degree of thrift and frugality beyond our comprehension must be constantly employed. In France wood is a commodity of a totally different character from what it has been in the United States. Even with the care and intelligence applied unremittingly to French forests, lumber is priced as an imported luxury. No one can become familiar with that country without appreciating how this fact handicaps the comfort of living and the industrial opportunities of the French nation. The gleaning of the forests for little fagots, the very scaffolds used in city building, which are made out of small poles carefully lashed together and used over and over again, tell the story. With all their beauty and picturesqueness the rural districts of France often leave an impression of decadence. A new structure of any kind is a rare sight and moss-covered stone buildings of the time of Jeanne d'Arc must serve the French farmer of to-day. Only a people great in industry and foresight could, under such limitations, have built up within an area less than that of our single largest state, the great industrial nation that France is to-day.

The lesson which such things bring home is, in a broad way, the same fundamental truth which underlies many economic problems of the present time—not alone those of America, but of the whole world as it strives to get back to normal industry. It is an old and simple axiom. Aside from the will to work which is the foremost quality of any strong nation, its economic and social progress depends in the long run upon the foresight and efficiency with which its natural resources are used.

Short a Million Houses

Consider for a moment our situation to-day as a nation of wood users. The United States at this moment is short at least one million homes. In comparison with the need, new dwellings are being constructed at a snail's pace because of the high cost of lumber, with other building materials, and of labor. From the shortage of homes arise exorbitant rents, crowded living conditions, and lowered standards of comfort and family life. The average farm in the United States needs about two thousand board feet of lumber every year for new buildings and improvements. Because the average farmer can not obtain lumber at prices within his reach, farm development is handicapped and the efficiency of agriculture suffers. This is a factor of no slight importance in our vital problem of food supply and living costs.

We need six and one-quarter million cords of wood a year to make our newspapers, magazines, books, pasteboard boxes, and other products manufactured from wood pulp. We are meeting this need at present only by importing a third of our paper or paper-making materials from Canada. We require from one hundred twenty-five million railroad ties each year to keep up and extend our railroad lines, aside from enormous quantities of timber used in other forms for railroad construction and the building of cars. We have to have at least six billion feet of timber yearly for boxes, crates and barrels, a requirement which is steadily increasing. In several highly developed agricultural regions an assured supply of containers for shipping farm products to market has become a serious problem in itself.

A group of our important manufacturers, the makers of wood veneers, handles, vehicles, furniture, and agricultural implements consume one and one-half billion feet of timber yearly. It is upon this group, perhaps, that the growing shortage of timber falls most heavily, since they require largely high grade hardwoods and other timber which the virgin forests of the United States furnished so lavishly, but which it is now becoming more and more difficult to find in sufficient quantities.

A Wood-using People

All told, we demand of our forests about fifty-six billion feet of timber yearly, aside from well over one hundred million cords of small material for fuel and various chemical products. There is nothing comparable to this enormous use of wood in the history of the world. We are pre-eminently a wood-using nation. It is wood that has developed our farm lands, that has largely built and equipped our railroads, and that supports many of our most valuable and distinctive manufacturing industries. We use from two to four times as much wood for every member of our population as the most highly developed countries of Europe. The abundance and general distribution of our native forests have had a tremendous part in the domestic and industrial development of the United States and in its bid for supremacy. We can not face the future without a sober and intelligent consideration of that fact.

The Wake of Devastation

The original forests of the United States are supposed to have covered eight hundred twenty-two million acres. Over two-thirds of this area has been culled, cut-over, or burnt. There are left today about four hundred sixty-three million acres of forest and cut-over land of all sorts, which contains about two thousand two hundred and fourteen billion feet of timber of merchantable sizes. Three-fifths of the timber originally in the United States is gone.

All told we are taking about four times the amount of wood out of our forests every year which we are growing in them. We are cutting more of every class of timber than we are growing. We are even using up the trees too small for the sawmill, but upon which our future lumber supply depends three and one-half times as fast as they are being produced.

Of still greater significance is the fact that the timber left is not in the right place. The crux of timber depletion is the exhaustion, or partial exhaustion, of the forests most available to the great bulk of our population. Less



Idle forest land in Canada which rapidly denegerated to dangerous sand dunes, and was later planted with pine and spruce.

than five per cent. of the virgin forests of New England and but twelve per cent. of her original stand of timber are left. New York, the leading state in lumber production in 1850, now manufactures only thirty board feet per capita yearly, or not more than a tenth of the requirements of her own population and industries.

The original pine forests of the Lake States, estimated at 350 billion feet, are now reduced to less than eight billion. In 1892 the sawmills in the region bordering the Great Lakes cut nine billion board feet of lumber and largely supplied the softwood markets of the Prairie and Central States and eastward to New England. To-day their yearly cut is a single billion. These four densely populated regions, stretching from the Atlantic to the Prairies, which formerly were lumber exporters and still contain enormous areas of forest land, are now partly or largely dependent upon timber grown and manufactured elsewhere and are becoming increasingly dependent upon timber which must be shipped the width of the continent.

The bulk of the building and structural timbers used in the eastern and central states during the last twenty years was grown in the pine forests of the south. But the cut of southern pine is now falling off and within another decade promises to exceed by little, if at all, the requirements of the southern states themselves. The shifting of the hardwood industries has followed much the same course. The principal reserve of hardwoods is in the Southern Mississippi Valley, and even here it is doubtful if the cut of hardwood lumber can be materially increased for any great length of time. The scarcity of high grade oak, poplar, ash, hickory, walnut and other standard hardwoods is now confronting many industries with a difficult situation.

Must be Close at Hand

One-half of the timber remaining in the Continental United States is in three States bordering the Pacific Ocean. Sixty-one per cent. of it lies west of the Great Plains. Since 1894 western timber has been filling gaps in the eastern and middle western markets. Within the past year it has assumed a dominating place in the principal markets of the States and has largely replaced southern pine at many consuming points in the Central States. It is estimated that within the next decade the shortage of nearer timber will compel the eastern and central states to increase their annual consumption of western lumber by eleven and one-half billion board feet.

The true index of timber depletion is not the quantity that is left but its availability. This is shown partly in the cost of transporting the average thousand feet of lumber from the saw mill to the

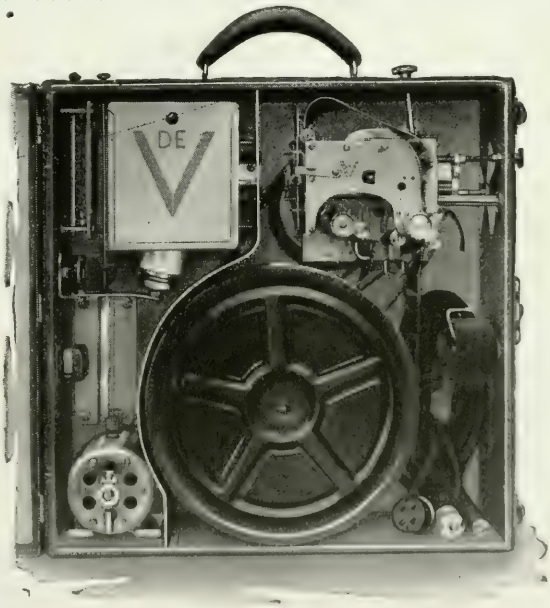
bulk of our lumber was manufactured user. Prior to 1850, when the great near the points of use, the transportation cost averaged less than $3 per thousand board feet. To-day it is probably $10. In another decade, at the freight rates now prevailing, it will reach $15 per thousand feet. But aside from rising freight costs, the exhaustion of nearby supplies of timber imposes upon the consumer all the disadvantages of being dependent upon distant and restricted manufacturing regions. These include congestion of transportation, the effects of labor shortages and bad weather in limited regions, and a narrowed field of competition.

Not only is the quantity of timber left in the United States being used up much more rapidly than wood is being grown; the availability of the remaining timber to the average consumer is steadily decreasing. The situation which confronts

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG

us now will be different only in degree if we allow the western forests also to be exhausted and are compelled to import most of our lumber from Siberia or South America.

Doubtless the extreme conditions of the present lumber markets will be relieved in no great length of time and more moderate prices will prevail. The outstanding fact remains, however, that lumber price levels higher than those existing before the war must be expected because of the depletion, or approaching depletion, of our forest regions east of the Great Plains. We are fast losing that great leveler of lumber prices, the competition between different forest regions available to a common market. The scarcity of forest products of high quality, cut from old growth timber, will not be readily or quickly overcome. Meantime forest depletion is going steadily on unchecked. It must lead inevitably to rising price levels under normal conditions. It will contribute to sudden and excessive increases in lumber prices in any future transportation, labor or other crisis.

Why Timber Depletion?

The real cause of our timber depletion is idle forest land. Shortages of wood have not resulted primarily from the use of our forests, but from their devastation The kernel of the problem lies in the enormous areas of forest land which are not producing the timber crops that they should. There are 326 million acres of cut-over timber lands bearing no saw timber in the United States. Their condition ranges from complete devastation through various stages of partial restocking or restocking with trees of inferior quality, to relatively limited areas which are producing timber at or near their full capacity. On eighty-one million acres there is practically no forest growth. This is the result of forest fires and of methods of cutting which destroy or prevent new timber growth.

The area of idle or largely idle land is being increased by from three to four million acres annually as the cutting and burning of forests continue. The enormous area of forest land in the United States not required for any other economic use, estimated at four hundred sixty-three million acres, would provide an ample supply of wood if it were kept productive. Depletion has resulted, not from using our timber resources, but from failure to use our timber-growing land.

It is unthinkable that the United States should be compelled to steadily contract its use of timber—down to the level of civilized existence as in the countries of western Europe. We are not an old world nation. We will have millions of acres of raw agricultural land to be developed. We still have millions of homes to be built and thousands of miles of T-rails to be laid. We are at the threshold of the greatest opportunity to expand our world trade in manufactures which we have ever had. It is unthinkable, I say, that in the face of these vast requirements and opportunities,. the people of the United States should be content to watch one of their essential and readily renewable raw materials become steadily scarcer and less available; that they should accept famine prices on timber as a normal condition, with enforced contractions in its use, embargoes, and governmental restrictions. And such a course is as unnecessary as it would be disastrous.

We have an ample area of forest growing land, over and above any probable demands for farm crops, most of it indeed unfit for cultivation—an area ample to meet all of our timber requirements if its timber-growing capacity is but put to use. From every hand, during the last few months, we have been told to increase production as the cure of our economic ills. I submit that increased production from land is as necessary as increased production by human labor. The idleness of millions of acres of forest growing land may be even more disastrous in its ultimate effects than the idleness of hundreds of thousands of skilled mechanics. And we have in America to-day an area of idle forest land equal to the combined forest of Continental Europe aside from Russia.

The answer to the forestry problems of the United States is not to use less wood but to grow more—to put our idle

acres of burned and logged-off timber land at work growing trees. This is not inherently a difficult thing to accomplish. Three-fourths of it lies in preventing forest fires. But it does require an aggressive national policy of reforestation.

Says The Calgary Herald

"The Canadian Forestry Association has undertaken a very practical work for Western Canada production. It will send through the west this summer a special car carrying exhibits of tree planting, to be shown to the farmers of the three prairie provinces, with accompanying lectures and moving pictures. The idea is to get the farmers of the plains interested in planting windbreaks for the benefit of their crops.

No one who has lived in the west for any length of time can doubt the importance of tree planting for windbreak purposes. The remarkable thing is that so few farmers seem to have taken the trouble to do anything of the kind. In the south country, where winds are more persistent and violent than elsewhere, and where the nature of the soil is such that it drifts easily, one may travel for days without seeing anything but the bald prairie, treeless, and uninviting. The few farmers who have been wise enough to plant trees around their grain fields have reaped enormous benefit therefrom.

In this connection, it is worth while relating the story of one Englishman in southern Alberta who came to the land when it was bare and bald, and who, at the very outset, planted windbreaks all around his holding. In fact, he did more than this. He located his building spot and started a real grove of young trees around it. Success attended the effort, and today, in addition to the ordinary grains of the south, this man grows within the circles of his windbreaks strawberries and small fruits in abundance; while the driveway from the gate to the house is a fine replica of an old English flower garden, where English perennials grow and flourish in profusion. And, on all sides of this man's farm, are other grain farmers who are constantly complaining of soil drifting and all the other attendant evils of the treeless, wind-swept prairie.

If the Forestry Association is able to persuade western farmers generally that the tree planting game is profitable, and can get them started at it, it will have done good service for the west. The pity is that more of this sort of thing had not been done before.

Address to Boy Scouts

At the request of N. O. Eaman, Provincial Commissioner of Boy Scouts' Association, G. H. Prince, Provincial Forester of New Brunswick, addressed the Boy Scouts on August 16th at their summer camp on Belleisle Bay on the importance of fire protection in order to maintain and conserve the forest and game resources of New Brunswick.

Mr. Prince pointed out the great loss that has resulted from forest fires in the past, and how that much of the loss was due to carelessness which was avoidable. He also pointed out the importance of maintaining the forests in producing capacity from the standpoint of Provincial revenue and general prosperity of the New Brunswick people.

There were 65 Boy Scouts present from all parts of the province. The boys took a deep interest in Mr. Prince's remarks regarding their province and many questions were asked regarding the administration of the Crown lands, forests, and game.

The Forests and Finance

Premier Taschereau, at a banquet in Quebec the other day in his address referred to the subject of the destruction of the Canadian forests and indicated that his government would give all possible encouragement to the movement for the preservation of existing forests and the reforestation of denuded areas.

Every thoughtful person is aware that Manitoba in the future will do much more in forest culture and tree planting than it has in the past. This will mean untold millions in money and even more in the matter of more pleasant living conditions.—Manitoba Free Press.

THE FOREST FIRE MELODY

We have men administering our vast forest wealth — men of rare special training — drawing salaries lower than are paid to an assistant manager in a dry goods store. Naturally these men feel compelled to leave the nation's service in time, when they find that they have to work for private interests if they would get decent living incomes.

Posterity is going to pay in millions for the thousands "saved" today in government salaries!—*Montreal Star.*

RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

FIRE HOSE FIRE EXTINGUISHERS
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.

30 St. Francois Xavier St. - - MONTREAL

REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

Mention the Forestry Journal for your identification.

Ownership of B.C. Forest Lands

	Square Miles.
Permanently alienated forest land:	
Railway grants	3,900
Crown granted lands assessed as timber lands	1,400
Alienated lands of which the proportion of forest land is not known but estimated at	14,000
Temporary or partially alienated forest land	14,700
Unalienated forest lands	115,000
Total forest land area	149,000



Mention the Forestry Journal for your identification.

BROMPTON PULP and PAPER COMPANY, Limited

EAST ANGUS, QUEBEC

MANUFACTURERS OF
NEWS PRINT PAPER
KRAFT PAPER
FIBRE PAPER
MANILLA PAPER
BOX BOARD
SULPHATE PULP
GROUNDWOOD PULP
and

LUMBER OF ALL KINDS

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Journal for your identification.

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks Montreal."

MONTREAL, QUE.



Communication

What is it worth to you?

Prompt—"On the Dot" Communication—that keeps your Mill and Woods Department in touch with your office in all weathers.

Uninterrupted communication between your Fire Rangers or Aeroplane Patrols.

MARCONI WIRELESS

Telegraphs
and
Telephones

MANUFACTURED, INSTALLED AND OPERATED BY

The Marconi Wireless Telegraph Company of Canada, Limited

Vancouver
Winnipeg
Toronto

11 St. Sacrament St.
MONTREAL

Halifax
St. John's
Nfld

Mention the Forestry Journal for your identification.

Vancouver, B.C., June 18, 1920.

Editor, Canadian Forestry Magazine,

Ottawa, Ont.

Dear Sir:

Your magazine has been a welcome addition to my waiting-room table for over a year. I believe it is read more than any of the others. It has three good things; brightness, cogency and pictures. It avoids three poor things: dullness, long articles and lack of purpose.

Wishing you every success,

Yours truly,

ERNEST P. FEWSTER, M.D.

Imperial Forestry Conference
(Continued.)

was mooted. It was felt that as the forestry agencies in all parts of the Empire have a focal point of mutual interest, with problems sometimes strikingly similar, there ought to be a common channel for intercommunication and a clearing house for information. The best advance advertisement of success for the Imperial Forestry Bureau was indeed the Conference itself. Delegates realized at the first session what an excellent plan it had been to project the Empire's forestry problems upon a single screen, to demonstrate the common objective shared by the foresters of Scotland and the foresters of Canada, the man at Dehra Dun and the man at Wellington. Accordingly, the Imperial Forestry Bureau sprang into being, the precise objects defined as follows:

(1) To collect, co-ordinate and disseminate information as to:—
 (a) Forest education, research, policy and administration; the constitution, organization and management of forests; and matters arising out of or incidental to the growing of timber and other forest products.
 (b) The resources, utilisation, consumption and requirements of timber and other forest products.

(2) To ascertain the scope of existing agencies with a view to avoiding unnecessary overlapping.

(3) To devise means whereby existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks.

(4) To supplement these agencies, if necessary in order to obtain any information not now collected which may be required for the purposes of the Bureau.

(5) To advise on the development of the forest resources of the Empire or of particular parts thereof, in order that such resources may be made available for the purposes of Imperial Defence or of Industry or of Commerce.

It is proposed that the Imperial Forestry Bureau should be established at London, under a director and an advisory council and that the Dominions should assist in the financial maintenance and share in the actual direction of the institution.

Forest Journeys

Had the Imperial Conference consisted only of parliamentary sessions from morning until night, there might have been complaint that forestry was solemn business indeed. That, however, is not the custom of Old Country organizers. Interspersed with the discussion at Lon-

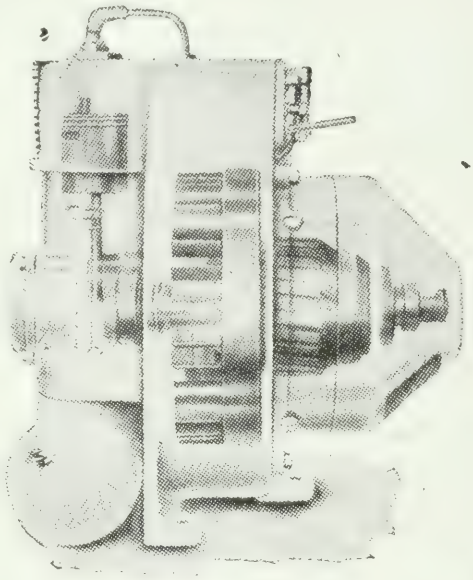
don were many fascinating journeys as guests of the British Government. For six days, the delegates were taken on a special train to Scotland and there by miles of tramping and motor car runs saw something of the healthy progress of private forestry on the large estates and what has been initiated already by the recently appointed Forestry Commission. It was in common evidence that the soil conditions and abundant natural moisture under which plantations have been established guarantee the fullest success to the British Forestry Commission in building up a reserve of coniferous timbers. Such exotics as Douglas Fir and Sitka Spruce attain remarkable height and diameter in even sixty years, quite equal to, if not beyond, the best records on the Pacific Coast of Canada. More details of the British forests and the planting programme of the British Government will be given in future issues of this magazine.

As every elaborate plan depends upon its executive officer, the Imperial Forestry Conference was most fortunate in having the tireless aid of Mr. O. J. Sangar, M.C., who as Secretary of the Conference performed a prodigious amount of work and made the day-to-day life of the delegates so free from anxiety as to quite unsettle many of them for the rough going of their normal existence.

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

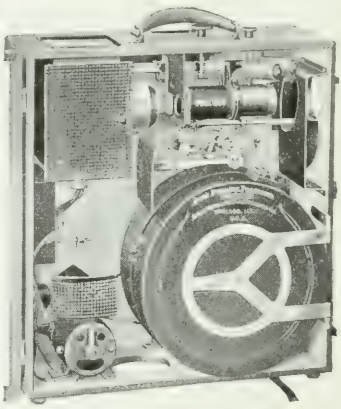
Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

Mention the Forestry Journal for your identification.



The Dynelectric Electric Light Plant

Weighing only 200 lbs., will give 900 watts of electricity. This equipment works with excellent results. for. motion picture projection.



The Acme Motion Picture Projector

Will project 10 x 12 foot picture. Equipped with fireproof safety magazine. Takes 1,000 foot reels of standard film. MOTOR DRIVEN—FAN COOLED

The above equipment is identical with that used on the tours of Canadian Forestry Association's Cars.

WRITE FOR DESCRIPTIVE CIRCULAR.

PHOTOGRAPHIC STORES

65 Sparks Street

OTTAWA ONT.

Mention the Forestry Journal for your identification.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country

Very Easy Bleaching Sulphite

Spruce, Pine and Hemlock Lumber

Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Mention the Forestry Journal for your identification

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador
Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL Old Town, Maine.

Mention the Forestry Journal for your identification.

ATTENTION ! **Fire Equipment, Limited,** is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West : : : Montreal.

Sir William Schlich on Canada's Policy

From a letter written by Sir William T. Schlich, until recently head of the Forestry Department at Oxford University, to Mr. Ellwood Wilson, Chief Forester of the Laurentide Company, Grand Mere, P.Q.

"You have 85% of the Canadian Forests as State Forests, but they are not sufficiently protected and systematically managed. You must, under a proper forest law, demarcate out a sufficient area to be placed absolutely under the management of the Forest Department, which must take steps to regulate the management, to thoroughly protect the areas, to prevent any settlement in the areas without previous permission and consent of the Forest authority. Also, to prevent the springing up of new rights."

Irrigation and Watershed Forests

Editor's Note:—Irrigation will prove the magic wand over millions of acres of agricultural land in Southern Alberta and Saskatchewan. It is well to bear in mind, also, that irrigation projects do not create water; they distribute the contents of existing streams. These streams, as far as concerns the two prairie provinces in question, take their rise on the Eastern slope of the Rockies and are dependent for their proper regulation on the protective ground cover provided by the forests. Wherever the sources of streams are bared of forests, the Spring "run-off" of melted snow and rains rushes without obstruction to the lowest levels, overflowing the river banks, washing away the best soil of farms and leaving a weak and insufficient flow of water for the later months when most required.

In perusing the following interesting excerpts from an address by Mr. G. R. Marnoch, President of the Lethbridge Board of Trade, Chairman of the Irrigation Development Association and a Director of the Canadian Forestry Association, the reader doubtless will hold in view the close relation of irrigation and forest maintenance, also the fact that while it is possible to grow trees on "dry" prairie, it is a much more certain and rapid process to grow them on irrigated land.

Farming under irrigation has proved so successful and profitable in the areas east and south of Lethbridge where it has been increasingly practiced during the past fifteen to twenty years that one might wonder why the demand for the extension of the use of the mountain stream waters has not hitherto been more clamant. The reason is simply this—that grain growing on dry land, in spite of the drawbacks of an erratic climate,

was, up till a few years ago, apparently more profitable.

In the opening up of a new country the situation may always be described tersely in the terms that land for some time is always relatively cheaper than labor. Quick development, or, as wiser men put it, quick exploitation of land, leads to the extensive use of land, with labor as the limiting factor. It took us some time to realize that there was another limiting factor—moisture. And now we realize that we have still another factor of limitation in the soil drifting, which has been a growing problem in the last few years all over Western Canada, which this year (1920) became so serious in parts of Southern Alberta as to be disastrous in its effects.

Farming under irrigation, while it must make agricultural operations more intensive, leading to the use of less land per unit of labor, will provide against the lack of moisture, and will provide means absolutely to control soil-drifting —further than that, it inevitably leads to the maintenance of the fertility of the soil, a matter that has received, unfortunately, far less than the attention that is its due in Western Canada.

Replace the Humus

We have been prone to think that our soils had illimitable quantities of nitrogen, phosphoric acid and potash to draw from; and while this may largely be true if the top soils stay with us, it certainly is no longer true when these rich soils blow away. The one sovereign remedy against this is the replacement of humus in the finely tilled soil. And there is, practically speaking, but one means for the provision of this humus available for us, and that is cow-dung. We cannot have that without cows, we can't have cows without pasture, and we certainly can't have many cattle on the farms unless we have irrigation to provide the necessary pasturage and feed. Then again, one of the most profitable crops under irrigation is alfalfa, which is in itself both a humus-builder and a nitrogen provider.

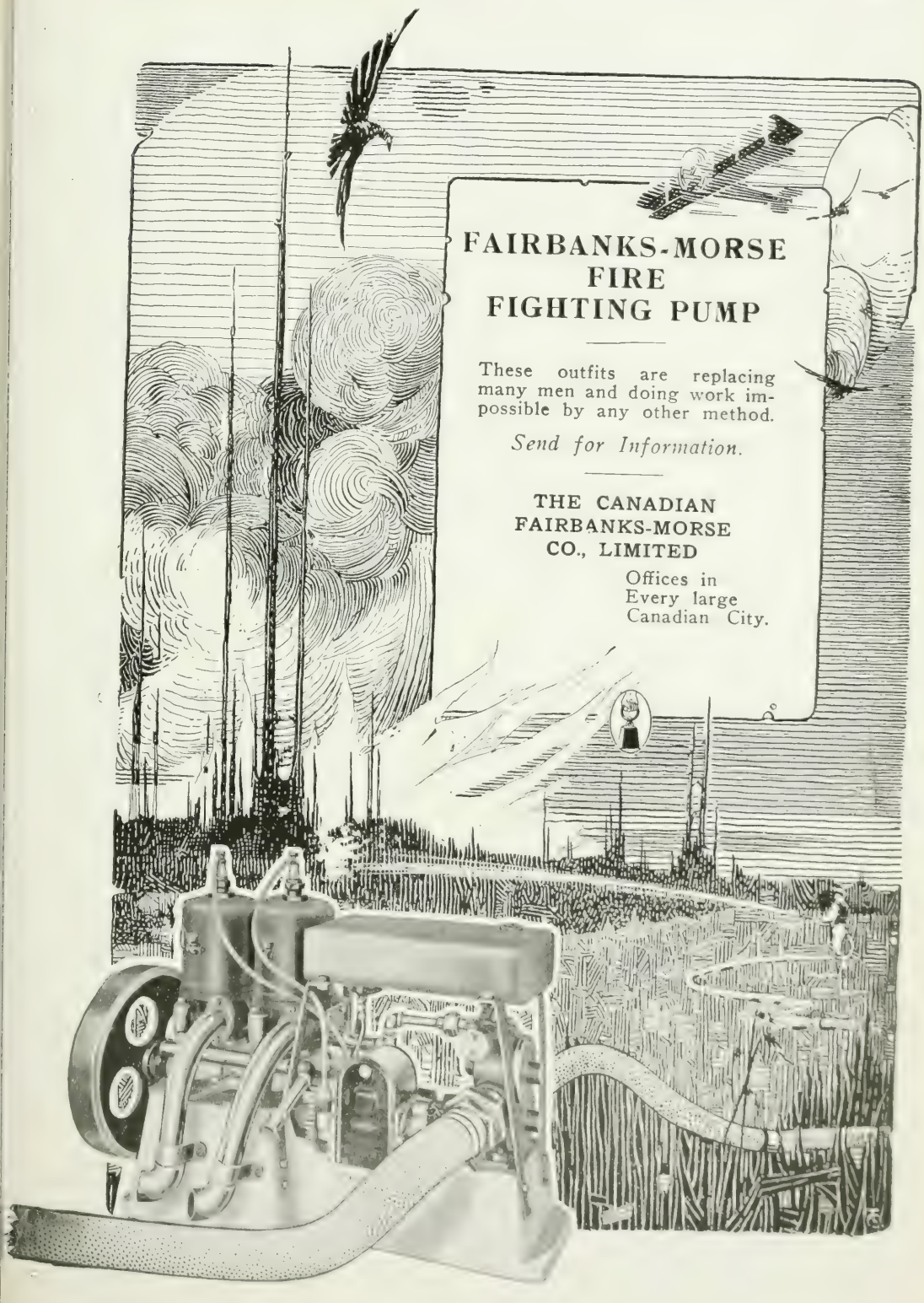
Remedy Close at Hand

It so happens, very fortunately, that in the area where the effects of soil-drifting have been most severe, the remedy is closest to hand. The Lethbridge Northern Irrigation District, which will draw its water from the Old Man river—an all-Canadian stream—is prepared to proceed at once with construction work just as soon as financing can be arranged. Every detail has been carefully studied by the Reclamation Service of Canada. At the instance of the Alberta Government the proposed project has been reported upon by George G. Anderson, an irrigation engineer of continental repute, having great practical experience both in the United States and Canada, who thoroughly understands all the engineering, financial, agricultural and human elements involved. The water supply at the very lowest stream measurements over a long series of years is guaranteed. There are no engineering works of any magnitude necessary, and the engineer of the district, H. B. Mucklestone, has had long experience as assistant chief irrigation engineer with the Canadian Pacific Railway Company.

The farmers who own the 110,000 acres that will be irrigable under the project are most anxious that construction should be proceeded with at once. Estimates of cost, generously conceived even at the present prices of labor and materials, indicate that when tenders are called or, they will show that the work can be carried through to a finish at a capital cost of less than $5 per irrigeabl acre. That the farmers will amply be able to pay the interest, and repay the capital on this expenditure during a term of say thirty years is clearly demonstrated.

Irrigation Will Pay

Taking wheat alone as an index, wheat production on "dry" land averages 30 bushels per acre, which, allowing for summer-fallowing half the acreage each year, gives 15 bushels annually; against 53 bushels annually on irrigated land—an increase of 3½ times in production. Even at pre-war prices of around 80 cents a bushel, and cutting down the estimated production to 40 bushels, there would be a gross return of $32 per acre per annum. Or, again, figuring in terms of alfalfa at the low rate of 3½ tons per acre at say $10 per ton, there would be a gross return of $35


FAIRBANKS-MORSE
FIRE
FIGHTING PUMP
These outfits are replacing many men and doing work impossible by any other method.
Send for Information.
THE CANADIAN
FAIRBANKS-MORSE
CO., LIMITED
Offices in
Every large
Canadian City.

per acre annually. So we are talking about a proved profitable business, on soils eminently fitted for irrigation, and in a climate which for fifteen years has not failed to show profitable results.

Is Keystone Project

The progress of the Lethbridge Northern is looked upon as the keystone to further irrigation development. The lands now under irrigation around Lethbridge, roughly 82,000 ares, made a gross production record in 1919 of $54.71 per acre; so it is hardly to be wondered at that those other areas to which water may be brought are most anxious for irrigation.

There are three other districts whose lands can be watered, like the Lethbridge Northern, from all-Canadian streams. They are the United District, west of Cardston, 15,000 acres irrigable; the Lone Rock, north of that, 10,000 acres; and the South Macleod, 30,000 acres.

The Dominion Reclamation Service is completing surveys on some of these, as well as on lands around Lomond, Travers, Enchant, and Sundial, north-east of Lethbridge, which may get water for 100,000 acres on an extension of the Lethbridge Northern canals.

In addition to these, irrigation may be carried to great areas south and east of Lethbridge, roughly 400,000 acres, from the waters of the St. Mary's and Milk Rivers; but these streams are not all-Canadian and the question of the division of the use of the waters is now under discussion and adjudication between United States and Canada before the International Joint Commission. An early solution of this situation is eagerly looked for.

With all the safeguards that have been devised for the management of irrigation Districts; with the Irrigation Council of Alberta in direct supervision of the farmer-trustees; and by the general overlooking eye of the Dominion Reclamation Service, there is no need to fear that every project will be carefully scrutinized in all its operations; and no doubt need be felt that these public irrigation projects will, very soon after their practical inception, command the sound financial credit to which they will be entitled.

LUMBERMEN ATTENTION!



Cut shows tug crossing Bay Chaleur with over 2,000,000 in tow. Distance 35 miles.

Invesigate our new patented towing and holding boom. Will save its cost many times over in preventing logs going adrift while being towed in open water, or for boomng swift running rivers where logs are held.

A. E. LOOSEN,

BATHURST NEW BRUNSWICK

The JOST COMPANY, LTD

Bought — PULPWOOD — Sold

285 Beaver Hall Hill,

MONTREAL.

QUOTATIONS ON REQUEST.

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST

DRYDEN, ONT.

Shippers to H.M. Government.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

✣

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.
Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.
We have assisted in the initial financing and distribution to investors of the **following securities which will be quoted on request:**

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.

Howard Smith Paper Mills, 8% Pfd. and Participating Stock.

Riordon Pulp & Paper Co., Common (10%) Stock.

Mattagami Pulp & Paper Co., 7% Convertible Debentures.

Wayagamack Pulp & Paper Co., First Mortgage 6 Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.

THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk

The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition Address
W. Smith Grubber Co.
11 Smith Sts.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA





QUEEN'S UNIVERSITY

KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. **NAVIGATION SCHOOL** December to April
26 GEO. Y. CHOWN, Registrar.

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber and pulpwood limits.

■■

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." Telephone: Main 3281.

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.

Sault Ste. Marie, Canada.

IF YOU WANT A CHEW
THAT WILL JUST SUIT
YOU

ASK FOR

STAG

CHEWING TOBACCO

RICH AND SATISFYING

IT IS ALSO KNOWN TO BE
"EVER-LASTING-LY GOOD"



Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Donnacona Paper Company.
Fraser Companies, Limited.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Whalen Pulp and Paper Mills.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities Corporation

Limited

MONTREAL

TORONTO, HALIFAX, ST. JOHN, WINNIPEG, NEW YORK, LONDON, ENG.

Mention the Forestry Journal for your identification.

October 1920

Illustrated Canadian Forestry Magazine





Bureau of Canadian Information

The Canadian Pacific Railway has established a Bureau of Canadian Information as a branch of its Department of Colonization and Development, with the object of disseminating reliable and up-to-date information as to agricultural and industrial openings in all parts of Canada.

WESTERN CANADA FARM LANDS

The Company has yet for sale several million acres of choice farm lands in Western Canada, at low prices and on long terms of payment. In certain districts lands will be sold without settlement restrictions, but the Company is prepared to grant special concessions to those who will settle upon and develop their farms.

IRRIGATED FARM LANDS

In its irrigation districts in Alberta, the Company has irrigated lands for sale at reasonable prices and on terms extending over twenty years. Under certain conditions, loans for improvements will be granted purchasers of irrigated lands in amounts up to two thousand dollars, to be repaid with land instalments.

EASTERN CANADA FARM LANDS

Lists of selected improved farms, available for settlement in Ontario, Quebec and the Maritime Provinces, with the names and addresses of their owners, may be obtained on application at any office of the Department.

INDUSTRIAL INVESTIGATION AND RESEARCH

Investigations, looking to the utilization of undeveloped natural resources and waste products and new industrial processes, are being carried on by the Research Section of the Department. Inquiries as to promising fields for investigation in this connection are invited.

INDUSTRIAL OPENINGS

Reliable information as to sites for new industries in all parts of Canada, and of special business openings in the growing towns and cities along the lines of the Canadian Pacific Railway in both Eastern and Western Canada, will be gladly furnished on request.

CANADIAN INTELLIGENCE SERVICE

Well equipped Canadian reference libraries have been established by the Department at Montreal, New York, Chicago, and London, England. These libraries contain the fullest information on all matters relating to Canada and her undeveloped resources, and are kept supplied with the latest information pertaining to new developments through the medium of a news service organized through the co-operation of the other departments of the Company's service. The information on hand in these libraries is available without charge to those interested, and inquiries addressed to any office of the Department will receive prompt attention.

DEPARTMENT OF COLONIZATION AND DEVELOPMENT CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.
WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.
CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.
NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.
CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.
LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

E. G. WHITE,
Superintendent,
MONTREAL, Que.

J. S. DENNIS,
Superintendent,
MONTREAL, Que.

VETERAN

motor trucks

Built in Canada

In buying a Truck of the **VETERAN** class your purchase price, although naturally more than the price of an inferior truck, saves you money in the long run.

You do not have to pay for your truck over and over again in maintenance and repairs. The **VETERAN** is a **ONE PRICE TRUCK.**

Eastern Canada Motor Truck Co., Limited

HULL, QUE.

Mention the Forestry Magazine for your identification.

Domestic and Foreign Banking Facilities For Your Home and Overseas Trade



THE ROYAL BANK OF CANADA

Total Resources $590,000,000

Join Hands with the Canadian Forestry Association

A COUNTRY-WIDE Educational Union of 11,000 citizens endeavoring to promote the national welfare through (1) the protection and proper management of Canada's forest assets, in order to perpetuate the timber resources for all time, and (2) the development of tree planting on the bare prairies and in our towns and cities.



Membership is open to all. Annual fee $2, including subscription to the Illustrated Canadian Forestry Magazine, a non-technical interesting monthly. If you like trees, you'll enjoy the Forestry Magazine.

Hon. President, SIR R. L. BORDEN Vice-President, DAN. McLACHLIN
President, C. E. E. USSHER Secretary, ROBSON BLACK
Ass't. Secretary, G. GERALD BLYTH

Suite 224, Jackson Building, - - - - - - - - - OTTAWA

Mention the Forestry Magazine for your identification.

British Columbia Forest Products



Display at Office of B.C. Lumber Commissioner, 1 Adelaide Street East, Toronto

For information regarding

BRITISH COLUMBIA

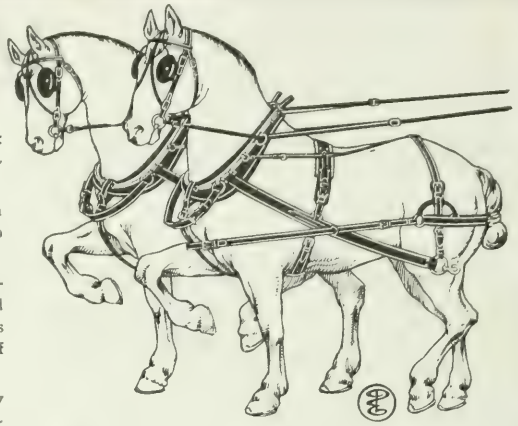
Douglas Fir	Western Soft Pine
Western Hemlock	Western Larch
Western Red Cedar	Sitka Spruce

Apply to

BRITISH COLUMBIA LUMBER COMMISSIONER

1 Adelaide Street East, Toronto,
or Chief Forester, Victoria, B.C.

A HARNESS BUILT FOR HARD WORK



For lumber hauling and strenuous work in the bush a good strong harness is invaluable.

And—this "Carson. Quality". Michigan Lumber and Skidding Harness knows no equal.

It is made of the best No. 1 oak-tanned leather, by the best of skilled workmen. The House of Carson stands solidly behind every strap and piece of material that enters into the making.

It is the harness that is being used by the leading lumber firms throughout Canada. It has stood every test. It is the harness that you will want to protect your team and get the most out of it.

Write us about your harness problems.

Ask for catalogue showing our full lines.

Carson Quality

Hugh Carson Co. LIMITED

72 ALBERT ST., OTTAWA, CANADA.

P.S.—We are headquarters for horse harness and equipment of all kinds, horse blankets, trunks, bags, suitcases, travelling robes and shoe findings.

Laurentide Company

LIMITED

GRAND MERE, QUEBEC

MANUFACTURERS OF

Groundwood Pulp — Newsprint Paper

Sulphite Pulp — Cardboard

Mention the Forestry Magazine for your identification.

IRCULATION: 12,000 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Magazine

VOL. XVI. PRINTED AT KINGSTON, CANADA, OCTOBER, 1920. No. 10.



The end of a perfect day. Lieut. Craham, of the Laurentide Company's aviation staff, alighting on Lac Tortue.

Use of Aircraft in Forestry and Logging

Ellwood Wilson

Chief Forester, Laurentide Co., Ltd.



An interesting account of effective work done this year by seaplanes in Central Quebec.



The writer has been in charge of the Laurentide Company's aerial work for two seasons and gives herewith the results of the work. The first season showed absolutely the practicability of the planes for reconnaisance of unmapped or mapped areas, for transportation of passengers and of fire-fighting equipment, for looking over the work of log drives, for spotting forest fires and for aerial photography.

The winter was spent in overhauling planes and engines and in the study of the pictures, taken from the air, on the ground. This spring a photographic laboratory was equipped so that photographs could be handled well and expeditiously.



Note the forest fire just commencing, also the facility afforded by aerial photograps in estimating the general forest conditions and relative areas of timber barrens, etc.

The work commenced on the 17th of May and has been continued regularly to date, the appended table giving the amount of work done.

Miles flown	6,006
Hours flown	101
Photos taken	3,000
Acres photographed..	543,100
Fires spotted	34
Passengers carried ..	23

Staking a Mining Claim

The longest flight from the base was 250 miles out. In the course of the work done above, many things of different sorts were accomplished. A flight of forty-four miles was made to stake out a mining claim. The plane carried four people, two tents, folding canoe, provisions and instruments. The party stayed out two nights and much time was saved, as, in the ordinary course of events, it would have taken two days travel each way by canoe, and with the plane it took less than an hour.

A boundary survey of some limits had to be made and the starting point was difficult to locate, as, if all the work were to be done on the ground, 22 miles of chaining through the woods would be necessary to locate an intersection from which to commence. The plane was sent up and the three sides of the triangle, necessary to locate the intersection, were photographed in one day and the course the new line would have to follow was also photographed, showing all the lakes, streams and hills which the line would cross.

On two sides of the triangle, where lines already existed, they were visible in the photographs at numerous places on the ground and could easily be joined up. Thus all of the field work is practically checked up before beginning the work, which can now be planned with great exactness. It is proposed to put provisions on the lakes which the line will cross ahead of the party so that they will only have to carry enough to last for



A vertical photograph of Shawingan Falls, P.Q., and village, from the Laurentide Company's seaplane.

a short time and save heavy portaging through the woods.

A Quick Job in Mapping

Explorers were taken over territory which was offered for sale, and of which there were no maps. The observer sketched in the burns, timbered areas and other information, and at the same time got a very good idea of the country as a whole. Then taking his sketch map he went in on the ground and estimated the timbered areas, saving much time which would have been wasted in locating the burnt areas. In one trip a reconnaisance of about four hundred square miles was made. The Logging Manager made several trips of this kind and with his sketch maps and his bird's-eye view of the country was able to lay out and direct the work of his explorers. Several flights were made to note the progress of drives and it was very easy to see just how the work was progressing and whether the streams were being swept clean or not. In one case a large number of rollways of logs were discovered, and photographed which had been left in the woods the previous season. Trips were also made to look over and estimate the number of logs in the sorting booms so that the time and number of men required to saw, so as to finish the winter, could be determined. The Logging Manager and his Superintendents were taken to and from distant points of their work and much valuable time saved.

An Air Inventory

One of the most valuable parts of the work was photographing lands which are to be purchased for planting. A complete dictionary of these lands was made, and as the photo gives every detail it is of great value. Lot lines, buildings,

fences, ditches, roads all show plainly and the areas of different kinds of land also.

Even the character of the soil can be seen. The areas in cleared land, swamp, burn, scrub timber, and good timber can be easily measured with a planimeter and the exact value of the land determined. A scale of prices for the different kinds and qualities of land is determined and all lands are bought by it. The seller and the purchaser can sit down over an aerial photo and make a trade much better than in any other way, for they have all the details before them.

In planning all kinds of engineering work, laying out roads, ditches for drainage, areas to be planted and so forth, the photos are of the greatest assistance, and by taking a series the progress of the work can be checked very much more rapidly than by ground measurements. The areas cut over in a logging operation can be checked on the photos, the roads can be seen, areas left uncut can be determined and the general efficiency of the work can be judged.

What the Work Costs

The general results from the work promise well and the Laurentide Company has decided to make aerial work part of its operations. Permanent hangars are being built, together with houses for the personnel and shops for the care of repair work.

The cost of the work, as carried on experimentally, has not been excessive and as it becomes standardized, can be materially reduced. The main thing is to have the machines in the air as much as is possible so as to cut down the unit costs of the work. The cost per mile works out at about $3 per mile and the cost of photographs at about 2.6 cents per acre. This is based on the use of the HS2L seaplanes which use about 25 gallons of gas per hour and are slow climbers. Also there are many items of expense which are incident to beginning the work and which will be eliminated later when more experience has been gained.

Easy Transportation.

To sum up the results so far obtained; for carrying men, whose time is valuable, to distant parts of the work, the planes are most useful. The manager of a company, with large woods interests gets tied down to his office and mill work, and a trip into the woods consumes so much time that he does not like to take it. The same is becoming increasingly true of logging managers and superintendents. They do not like the hardships of long journeys into the woods and the being out of touch with their general work for days at a time. With the planes, the most distant operations can be visited and the work inspected with only one night away from home. Local foremen in the woods will be kept up to their work much better. In case of accident doctors can be rapidly taken into the woods and injured men brought out. Mail can be taken in and reports brought out much oftener.

For rapid reconnaisance the planes are invaluable. Tracts which are for sale can be inspected in days where weeks were required and the information obtained is much more accurate and fuller than can be had from ground work. In a few hours in the air, the general drainage of a country can be determined, burns, swamps and timbered areas sketched in, the species present noted and the general character and quality of the timber ascertained. Windfalls and insect damage can be seen and all areas estimated with more accuracy than from a strip survey. When the ocular survey is supplemented with photos, there is no room for doubt about the character of the country and instead of depending on the opinion of the man who has made the reconnaissance, all the responsible men interested can get together and discuss a purchase or a proposed operation intelligently and with the information before them.

Spotting Fires

Spotting forest fires and taking help to extinguish them is a valuable part of the work.

The carrying of provisions to distant operations will certainly become a part of the work before long, doing away with the building of expensive tote roads and making possible the placing of provisions just before the work begins, in-

stead of taking them in the previous winter, thus doing away with spoilage and the cost of insurance and the labor necessary to watch them. Then, too, it will not be necessary to build large depots from which, oftentimes, quite long hauls to separate camps must be made, but provisions and gear can be put right down at each camp.

In the purchase of lands for other than logging purposes, aerial photos are invaluable, giving as they do, ALL the information required.

Are Aerial Photos Reliable

The aerial camera is going to be more and more indispensible. So far as our studies have gone, the types of timber and land can be accurately determined. The actual number of trees in the crown cover can be determined and a fair idea of the general size of the stand obtained. For forest maps they are infinitely better than ground surveys, giving all the information needed rapidly and accurately and in a form which everyone can easily learn to understand. Instead of the information being stored up in a man's head or in his notes which are often colored by his personal idiosyncrasy, it is always available and leaves no room for varying opinions.

The technic of reading these pictures and of making estimates from them is being carefully and thoroughly studied and a regular dictionary being built up. Much ground work will be carried out this winter, especially in the estimation of quantities from the photos.

The Seaplane is Best Type

The following general conclusions can be drawn from the experience gained thus far. For work in country where there are many lakes, the seaplane is the best type of machine. The float type has not proved satisfactory, as the floats are very fragile and easily become waterlogged. The seaplane is structurally strong and rugged and will stand much harder usage. It presents fairly stable platform for a camera. The type we are using is ideal from every point of view except cost of operation and we have purchased a Curtiss "SeaGull" for patrol work, passenger carrying and photography.



"The actual number of trees can be determined." This photograph gives a good idea of what an air photograph discloses.

The larger machines will be used for carrying provisions, large parties and fire fighting apparatus.

Choose Pilot With Care

The personnel of a flying station is a matter of great importance. Experi-

enced pilots are necessary, and the fact that men have wide experience in flying land machines does not always qualify them for seaplane work. Only the highest type of men should be employed, both as pilots, mechanics and riggers, as men of a lower type are likely to have a lower sense of the responsibility and importance of their work. Men who are reckless or who drink should never be employed.

Rigid inspections before flights are absolutely essential and no machine should ever go up if there is the slightest doubt about it being in perfect flying condition. The amounts invested are large and the loss of a machine is a serious matter, ever leaving out of account the risk to the personnel.

Uses of the Dirigible

The development of the "Pony Blimp" or small dirigible, opens up a new line of development which is very promising. With a speed of 45 miles per hour and a wide cruising radius, it uses only three gallons of gas per hour and has a greater carrying capacity than a plane. As it can be stopped in the air at almost any altitude, it offers an ideal means of timber cruising and mapping and for carrying fire fighters and equipment and also supplies for survey parties and logging camps. If the risk of fire is not great and the cost of plant for charging with gas not too expensive it will be an ideal adjunct to forestry and logging work. It will also do away with, what in the northeastern part of the continent is a great drawback to aerial work, the inability to fly in winter. It may be that we shall be able to make flying practical but so far it is out of the question with planes on account of the low temperatures and deep snows which we have in eastern Canada.

I feel that aerial transportation and photography have come to stay and that with careful, well thought-out development will prove invaluable in the management and exploitation of large timber holdings. We are constantly trying to study out new ideas for the planes and the camera and are sure that their field of usefullness will become larger and more important.

GROWING SQUARE TREES!

Cambridge, England. — The Cambridgeshire School of Forestry believes that "there is no reason why trees can not be made to grow square and produce wood of better quality and in greater quantity" if the excessive wood production in certain trees can be controlled. The association believes that this can be done and if so "there will be no more slabs nor wavy planks."

The lumber trade is not likely to invest much in the square tree proposition. But, if it is a success, there is no reason why some other new things shouldn't be developed. For example, an auger that would bore square holes.—*American Lumberman.*

FOREST INDUSTRY IN POLAND.

The Polish paper industry consists of great enterprises, with a working capital of 100,000,000 marks. In 1913 there were in Poland nineteen paper factories and 20,000 work-people employed. The produce consists of almost all varieties of paper.

Galicia is in a much better situation than the Kingdom of Poland itself, as she has more woods and quick rivers.

THE BUFFALO AND THE TIMBER TREE

"Not only has the buffalo gone from the prairies but the forests have fast disappeared. With the disappearance of the forests the wild thing that dwelt there have also gone and the amount of moisture in the air and the rainfall has changed. Drainage has added to the change that is so gradually going on that it is not noticed.

"People have become so used to finding their newspaper or their magazine in their homes that they give no thought to the possibility of having to do without it. Yet with the going of the forests the basic source of newspapers is disappearing.

"Without pulp wood there can be no papers and reforestation is the only means of meeting the problem yet little has been done toward that end."

Border Cities Star, Windsor, Ont.



On the grounds of Mr. and Mrs. Sovez, Alsask, Sask., where the growing of tree belts has paid big dividends in great crops of luscious small fruits..."Seeing is believing," writes Archibald Mitchell, of the Canadian Forestry Association staff, who took the picture, "but tasting goes it one better." Mr. Arthur Cooch, assistant to Mr. Mitchell, is seen in the foreground, reaching out for an extra tempting patch of strawberries.



Do trees grow well on the prairies? This is the reward gathered by Mr. Anderson, of Alsask, Sask., for a little planning and a few years' cultivation.

Strange Facts of Strange Trees

One of the South American acacia trees manufactures electricity for its protection—or, more properly speaking, it is an electric dynamo. On touching it, one receives a shock so distinct that he is not desirous of coming nearer. Scientists are now working on the theory that certain electrically charged trees exchange electrical or magnetic impulses through the air.

Scientists admit that trees have their laws of marriage and courtship. The Indian fig tree is such an ardent lover that he will actually take on the form of a vine if his mate chances to grow a distance from him, and by this means reach out his arms, that he may embrace her and powder her face with his perfumed pollen.

In western India there is a tree that blossoms only in the dark. For some reason, possibly because as ordinarily seen it is of plain and desolate appearance, it is called the sorrowful tree. Every evening in the year it breaks into bloom, but with the rising sun sheds or folds up its flowers.

The Germans used the seed of the sabadilla, botanically known as Schoenocanlon officenali, for the manufacture of the lachrymatory and asphyxiating gases stored in their "weeping bombs." The seeds of this strange and interesting plant or tree are in form and color like our oats, and stored, they emit a piquant smell so strong as to make the eyes water copiously; they also make breathing very difficult and painful.

The cocoanut palm is an example of a single tree which can be made to supply all the needs of a not too luxurious member of society. In certain islands of the southern seas this prolific plant furnishes the natives with the wood from which they build their houses, their boats and their utensils. When the leaves are young they are eaten. When they are old, they are woven and braided into hats, baskets, cloth, fans, bedding, paper and thatch. The ribs of the mature leaves are converted into arrows, spears, brooms, torches and paddles. Out of the flowers come wine, vinegar and sugar. The fruit makes a delicious food, and its husks yield oil, cord and matting. Even the roots are sometimes used for food.

The sweet gum, sometimes called gum-amber, actually plants seeds within itself. The tree first grows hollow within, and then the seeds find their way into the hollow. When the tree is ready to die, the young take up the life thread and, pushing their way through crevices in the bark, burst the maternal trunk asunder.

The oak is the most common tree in northern United States.

The palm tree has for centuries been conceded the emblem of victory.

The wild cherry, with its beautiful red-bronze bark, is a miser. It is so niggardly that it can not bring itself to part with its own dead branches but retains them indefinitely.

Scientists declare that not a few trees have become extinct as a result of intermarriage with foreign trees, or different species. In some cases a healthy hybrid is produced (as Burbank's plumcot) but more often there is no offspring.

The "Sneeze wood" tree of South Africa has a unique way of protecting itself against enemies. Its wood is light brown in color, runs very close grained, is so hard as to sink in water, is bitter to the taste, and emits a microscopic dust on being sawed or cut. No insect or worm will touch it and men who handle it are continually sneezing.

The sandalwood is termed the "perfume wood" tree, although it is not alone in this quality, as indicated by our own sassafras and cedar.

The sapota tree is the "chewing gum tree." Chicle is the proper name of the life blood of this tree from which the gum is made. It grows in South America, Central America and Mexico. It produces a fruit called the sapodilla pear, and has a straight, clear timber trunk.

The cinchona tree, of tropical climes, produces the quinine of commerce.

The natives of the Niger gather immense quantities of butter from the butter-tree. It abounds in such great quantities that it is likely to become an article of commerce.

If a man wishes milk when traveling in the forests of Caracas, South America, Mother Nature supplies him most abundantly from the cow-tree. This product has not only the exact appearance but all the qualities of cow's milk.

The wine-palm of western Africa yields a delicious sap which, mild when first drawn, begins to ferment in a very few moments after it is exposed to the air.

Musings of an Old Axman.

By Douglas Malloch, the Lumberman Poet.

Thays a good dele ov bad in moast everbuddy but moast of it happened yisterday so furgit it an' remember that thays juss as mutch good in us too an' that its thar' t'day so why wurry about yisterday?

When I look around an' see th' world with th' sun a shinin' on it I cant figger how come the kizer t' ever think o' such a thing as war—it dont belong nowhers.

Ever onct in a while I see a feller I'd like t' camp with—an' onct in a while I see one I'd like t' have camp with me. Doant yo' find it so?

Land Settlement and Paper Mills.

Speaking at a meeting at Monteith, Ont., Mr. R. A. McInnes, manager of Abitibi Power & Paper Company, Iroquois Falls, said that few people realized what the pulp industry meant to the North. The Abitibi Co. paid last year three and a half millions in wages alone. Then there were other mills at Smooth Rock, Kapuskasing and so on. In a few years the wages paid annually by these and new mills would run to the enormous total of $15,000,000.

Another sign of the importance of the forest was the Abitibi Co. had paid in freight to the T. & N. O. in the past year $950,000 and the other companies in proportion.

The investment in the past three years by pulp companies had been $60,000,000 in the North country and it was just beginning. That showed the enormous importance of the industry to the North.

Where does the farmer come in? The pulpwood industries must have settlers; they must have produce and labor. First comes the large industry, then must come the settlers; roads are needed. The companies and the settlers must work together. It is useless for the people of the North to act individually. They must first work out a programme for the North and then go to the Government and get what they want.

Mr. Vere C. Brown Chosen.

The board of directors of the National City Bank of New York at a meeting recently elected Mr. Vere C. Brown, western superintendent of the Canadian Bank of Commerce, to the position of executive manager of the National City Bank. Mr. Brown will assume his duties in New York in the near future. He entered the service of the Canadian Bank of Commerce in 1857.

Mr. Brown is a Director of the Canadian Forestry Association and has given invaluable aid upon many occasions.

Please send in your membership fee promptly.

The members are responding splendidly to our new plan of a Two-dollar Annual Fee, including subscription to the Forestry Journal.



An interesting photograph from the Great War. King George was visiting a Canadian Forestry Camp and was greatly amused at a young captive boar, shown to him. Immediately at the King's right is Brigadier-General J. B. White, of Montreal. Lord Lovat, Chairman of the British Forestry Commission, is at the left of His Majesty.

Should I Plant Trees in Fall or Spring?

What is the best time to plant a shade tree, in the spring or in the fall?

The question confronts many city and suburban home owners every year. Very often the owner has consulted some one interested in selling him nursery stock and the answer he has received depends upon the time of the year he has made the enquiry. Early in the year he is told "Plant in the spring," later he is advised "Fall planting is the best." Theoretically a broadleaved tree may be successfully transplanted at any time that it is in a dormant state and making no growth, that is, between the falling of the leaves in October and the swelling of the bulbs in April. In the case of fall planting there is a danger on some sites of the tree being upheaved by the ground. This however can often successfully be overcome by a heavy mulching of manure about the base of the tree. Fall planted trees are as a rule slower to open their leaves and begin new growth than are those that have been left undsiturbed until planted in the spring. The chief objection to spring planting is the shortness of the season during which it may safely be done. At that time there is so much other work starting up that everybody is rushed and there is greater chance of careless handling, also delays in delivery from the nursery are more serious in the spring than in the fall. In short it may be said that both spring and fall are good planting seasons but that the spring planting gives on the whole the best results.

When to Prune.

At what time of the year should the pruning of shade trees be done? This question is also frequently asked by the tree owning readers of this magazine. Although the pruning of shade trees is often desirable the season for performing this operation is not nearly so im-

portant as in the case of pruning for the production of fruit. It may be said in general, that pruning should not be done before midsummer. Leave all heavy pruning till fall or winter. Early in the growing season the sap is flowing freely and results in needless loss to the tree. Also this flow will often prevent any dressing that is applied to the wound from adhering properly. Light pruning may be done when the foliage is on the trees if it is for the purpose of shaping the tree. The removal of dead boughs is also best done when the tree is in leaf as the dead branches are then more readily detected.

A third question often asked by tree owners is in regard to fertilizing. Well rotted straw manure is probably the best fertilizer than can be used. It should be spread thickly in the fall over the whole area covered by the crown of the tree and left there throughout the winter. In the spring this should be well worked into the soil. In the case of trees grown on well kept lawns working in cannot be done without injuring the sod; however, the mulching itself will be beneficial if the manure is left until fairly late in the spring to permit the rains to wash some of it into the soil. *B. R. Morton.*

A Forest Tragedy

By John D. Guthrie, in "American Forestry."

He left his camp fire burning to see if the Lookout would pick it up.

He did.

He thought this would be a good test to see if the District Ranger was on the job.

He was.

He wondered if a fire would burn very fast in the dry forest.

It did.

He thought he could get away before the Ranger could catch up with him.

He couldn't.

He thought he could bluff the judge at his trial.

He didn't.

He wondered if the Judge would have the nerve to sentence him to jail.

He did.

We wonder if he will put out his camp fire next time he is in the forest.

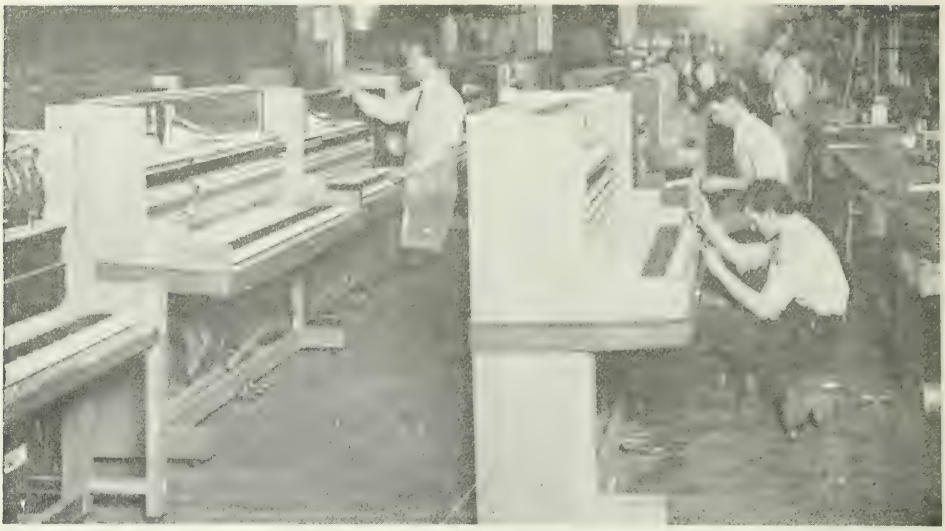
HE WILL!

A Family Friend

Mr. Fred Rogers, of Bristol, N.B., is the proud owner of this stately elm tree. Mr. Rogers' grandfather when he settled at Bristol over a hundred years ago cherished and cared for this tree. In later years his son to whom the farm on which the tree stood was bequeathed,



sold a portion of the farm and the tree as well. However, he soon rued the sale of this time honored and stately tree and bought back the elm and the ground for a radius of 25 feet about its base which he states he will retain permanently in his family.



Installing the "piano action" and tone regulating. The action is put into position after the back is completed but before the case is finished.

Pianos in the Making

By G. Gerald Blyth, Assistant Secretary, Canadian Forestry Association.



The building of a musical instrument--what trees are used and why.



Among the hundreds of wood-using industries spread all over the Dominion there are few more interesting and scarcely any where individuality and the sensitive and sympathetic touch of the human hand plays such an important part, as in the making of pianos. Pianos are finding their way into an ever increasing number of homes throughout the land where they contribute their share in providing entertainment and inspiration of the loftiest kind.

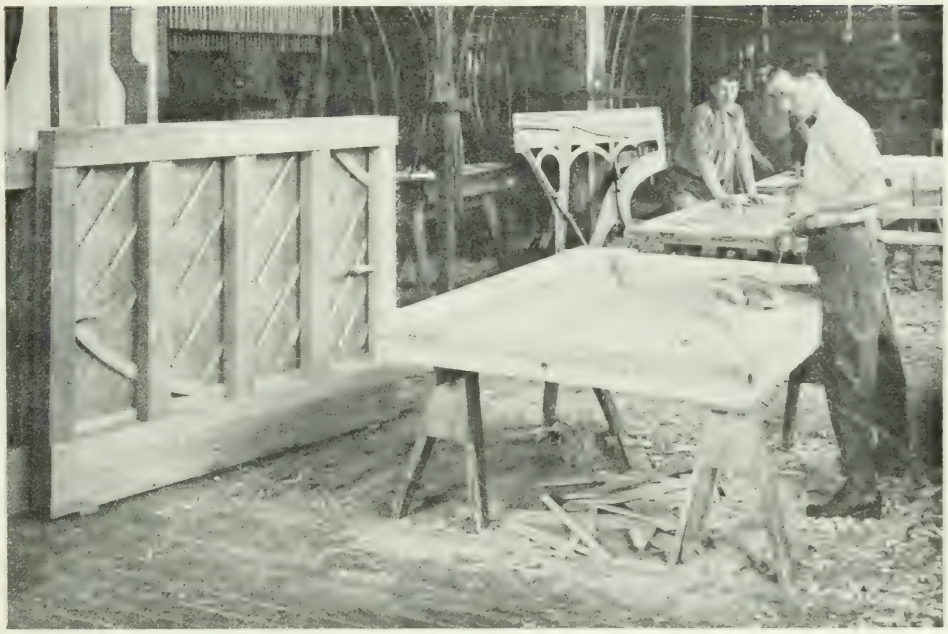
It is the purpose of this article to give our readers an insight into the manufacture of pianos, describing the various stages in the process of their construction and an idea as to the species of wood that go to make up a piano.

Selecting the Wood.

The various kinds of wood used in the making of pianos have to be carefully selected and only the highest grades are suitable. Spruce, Maple, Birch, Walnut, Poplar, Gum-wood, Canadian and American Oak, Ebony, Rosewood and Ash, are the principal woods used and mention will be made further on as to species which enter into the manufacturing of the principal parts. After the lumber reaches the factory it is piled in the yard where it is weather-seasoned for at least two years and longer when possible. A further seasoning is necessary before it can be used and consequently the lumber is placed in dry kilns before it is available for use in the shops.

The Sawing Process.

The lumber is next taken to the woodmill where it is sawed into widths practically all of which are less than six inches. This is necessary to insure that the grain in the contiguous pieces of



On the left is a completed back or "rim." In the foreground the sounding board and bridge are being secured to the back.

wood is so arranged as to prevent warping and also to secure that harmonious arrangement of the grain of the wood which long experience has showed to be most conducive to the best tonal effects. From these small widths are built up the various larger members that enter into the piano such as the "back" or "rim"; the delicate sounding board, the heavy posts of the frame and the various sections of the case. No screws or nails are used but by glue and pressure the larger portions are built up or shaped as required.

Having touched upon the preparation of the wood before it is shaped and built up as well as mentioning the principal woods utilized, let us now pass on to the actual construction of a piano.

The Back or "Rim."

This in the foundation to which the whole system—sounding board, plate, pin-block and strings is attached. It assists the metal frame in taking up the strain of the strings, which often aggregates 25 tones and by its intimate connection with the sounding board assists in securing the desired resonant qualities.

The back or "rim" of a Grand piano is constructed somewhat differently but it is intended to describe only the ordinary upright type in this article.

Each post which goes to make up the back of a piano is made from several carefully selected pieces of wood, accurately matched and glued together, not a single bolt or screw being used. Cut No. 1 shows a corner of the factory where a number of backs are receiving the final touches. The heavy posts are made of Maple or Birch. At its upper end the back or "rim" carries the pin-block or tuning block which is made of maple. This section of the piano is built up of several layers of maple glued one upon the other with the grain running in alternate transverse directions. The "rim" after it has been glued together in the rough is next planed down to its finished dimensions.

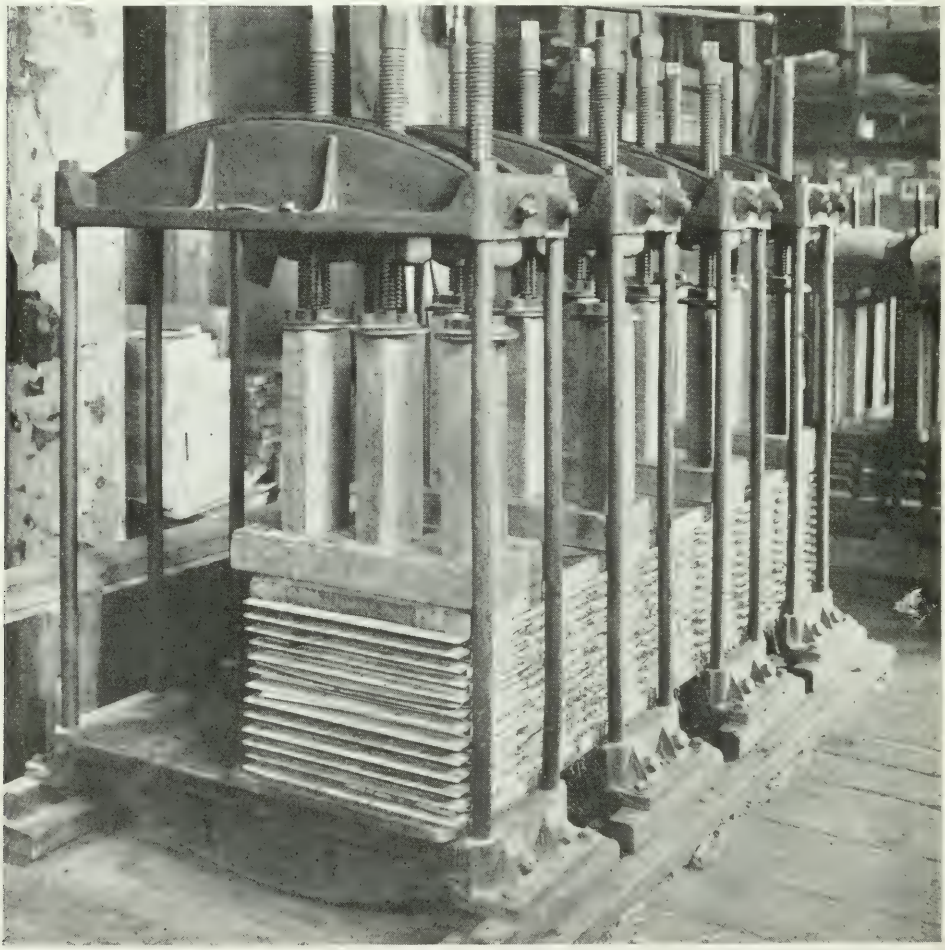
The Sounding Board.

The sounding board is made of Canadian White Spruce and the richness of tone is chiefly dependant upon the selection of the wood and arrangement of the grain in building them up of a number of narrow strips. The function of the sounding board is to increase the area of vibrating surface which is in contact with the air. The piano strings alone have

too little surface area to effect the auditory nerve. The sound board which is connected with the strings through the bridge increases their vibrating surface many thousandfold. In building up the sounding board only the most elastic lumber can be used which will produce vibrations with a minimum expenditure of power. The quartered wood is cut so that the "season rings" run at right angles to the grain, and the many strips which go to make up a sounding board are between 3 and 4 inches in width. Those strips which have a wide grain are placed opposite the bass strings and those with the closer grain are opposite the treble. The board is glued together in the rough, is about one-half inch thick, and it is planed and sandpapered down to a finished thickness of from about a quarter in the base to three-eighths of an inch in the treble end. This is the work of a specialist and calls for a great degree of skill. A series of parallel pine battens or ribs are firmly glued to the back of the sounding board to strengthen it and also to give to the board the correct curve. A curved maple strip known as the bridge which is about 1 inch by 1 1-8 inches is fitted diagonally across the sounding board.

The Plate.

As mentioned before, the back or "rim" is the foundation of a piano. We



These are the powerful presses in which the pieces of veneered wood are placed, after the gluing process. The piano case itself is made of Ash, on which are glued four thin layers of mahogany or walnut veneer. The engraving shows a number of sections in the press.

have seen how the "rim" itself is built up and finished off. After the sounding board pin-blocks and bridge have been glued on to the rim, the next operation is the attachment of the plate. The plate is secured down by means of bolts and set screws and consists of a strongly ribbed and carefully designed casting made of special iron alloy. The plate has to perform the important function of carrying along its lower end the pins upon which the strings are strung and of bracing at its upper end the pin-block into which the tuning pins are driven. The plate is called upon to stand a tremendously heavy strain amounting in the aggregate to several tons but as before mentioned the back or rim assists to a certain degree in bearing this great strain. As we are chiefly concerned with the wood-using end of the industry it will not be necessary to enter into a detailed description of the design and construction of the iron plate.

The Strings.

These are essentially the sound producing mechanism yet were the greatest of care and skill not used in the selection, seasoning and putting together of the various woods that are used the strings would not produce that singing quality for which these pianos are noted. A highly-specialized grade of wire is used and the operation of "stringing" a completed "rim" calls for a high degree of skill and workmanship.

The Piano Action.

In these days of standardization and specialization the majority of piano manufacturers find it more profitable and satisfactory to import the "piano actions" they use which are made to their requirements and specifications by companies who specialize entirely in constructing same. Wood is used largely in the manufacture of the "piano action," such as in the hammers and the keys themselves and the principal species in general use for this purpose are maple, basswood, ash, cherry and cedar. As lightness is very essential consistent with strength, the wood is so cut that the grain shall, in each member, lie in the direction which is most suitable to the strain which that particular piece must endure.

The Keyboard.

In the early stages of their manufacture keyboards are formed in one piece consisting of a board of white pine which in turn is composed of several widths glued together with the grain so arranged that it shall run approximately in the direction of the finished keys. The board as first glued up, dressed and finished to size is about one inch thick by two feet wide by six feet long. Along one of the long edges is glued a thin strip of ivory. The board is then spaced off into the proper number of keys and after the keys are accurately lined upon the board they are sawn out by a band or fret saw and the ebony keys are glued down on the proper members.

Making the Case.

The body of the piano case is of ash to which the thin strips of mahogany and walnut are glued. Four strips of veneer are used in each finished section of the case to one layer being glued on with the grain running opposite to the next. Cut No. 2 shows the powerful presses that are used in the glueing operation. From the veneered pieces the case is built up and the already completed back action and key-board are fitted. Next comes the polishing operation which is a slow and costly one. The outside portions of the case such as the doors, the sides, the cover, etc., are given seven distinct coats of varnish. A coat of varnish is first put on with a brush. The brush marks are then rubbed off with pumice-stone, the pumice-stone marks are removed by rotten stone and finally the rotten stone marks by hand, there being no polishing agent equal to the human skin. These steps are successively carried out for each of the seven coats after which the case presents the desired grain and lustre.

The piano is then very thoroughly inspected, such details as regulating for touch, tuning and tone having been previously looked after. The Forestry Magazine is indebted to the President of the Martin-Orme Piano Co., of Ottawa, for assistance in gathering information for this article and for courtesies shown during visits to the company's factories.

Growing New Crops of White Pine

On the Harvard Forest, experiments in securing a maximum reproduction of white pine gave this conclusion.

That the best reproduction was secured following a heavy thinning, involving the removal of one quarter of the trees per acre.

Stands so treated have in five years shown as many as 25,000 seedlings per acre. At the end of five years the remaining cover wood was removed.

Clear cutting in strips or in patches gave various results, mostly favorable, But was open to the objection of higher costs, due to the scatered area.

With the annual harvest of Canada's premier wood—white pine—steadily decreasing, as regards what is taken from Crown Lands, our readers will be interested in studies made on 54 separate logging operations in Massachusetts and New Hamphire during four years, by R. T. Fisher and E. I. Terry, and published recently in the Journal of Forestry.



Of the 54 separate areas examined only 14 showed satisfactory reproduction of pine. This was taken to mean 500 thrifty seedlings or more per acre. All of these 14 lots were cut in seed years, that is, in the autumn or winter following the fall of seed. Two lots cut in seed years showed no reproduction, the failure beind due to the fact that the previous stands were unusually dense and below the seed-bearing age. Of the remaining 40 woodlots cut over in non-seed years, only 10 showed any pine reproductoin at all, and of these 10 only one anything like a sufficient seeding. These partially satisfactory results were always explainable on account of accidentally favorable conditions, such as the proximity of seed trees and the smallness of the area cut. The examination showed that general site factors such as slope and aspect had little or no effect, but that the condition of the seed-bed was apparently of first importance. Heavy ground cover and leaf-litter was unfavorable; thin leaf-litter and humus with mineral soil mixed with it or exposed made the best seed-bed. If seedings failed to start within from 2 to 5 years after the cutting, the development of other vegetation kept them out entirely. Incidentallly the study showed that under dense stands no reproduction survives, but that under open or mixed stands advance growth of white pine may survive for years. There was no evidence of reproduction from seed stored in the leaf-litter more than one year. Outstanding facts were that on all but the lightest of the local soils, the hardwoods are gaining, and that the composition of the present forest types has been controlled in the main by the previous treatment of the land.

Taking the total area of the woodlots examined, about 15 to 20 per cent showed good pine reproduction; on another 20 per cent pine seedings were scattering. On the other hand from 60 to 70 per cent of lots cut both in seed years and non-seed years, was satisfactorily stocked with valuable hardwoods such as red oak, white ash, hard maple, etc. These figures apply only to the first 10 years after cutting. However successful the reproduction may be at the start, within 10 years from 10 to 80 per cent of the

desirable elements, both pine and hardwood, was overtopped and suppressed by inferior species and clumps of stump sprouts.

Harvard Forest Experiments.

In respect to the various ways of handling the pure pine type which have been tested on the Harvard Forest it can be said that all of those methods which involve the removing of the stand in two or more cuts have proved successful. On account of certain practical and financial factors good reproduction, however, is not the only criterion of a workable method. This will perhaps appear more clearly from a statement of experience with the different systems of cutting.

Clear-cutting the Whole Stand.—This method has been tried on areas of from two to four acres. Cuts were made in the winters following the seed years of 1908 and 1914. All slash was burned in piles. A reproduction followed in which there were from three to four thousand thrifty pine seedlings per acre at the end of four years. This method is obviously the best from the point of view of cheapness in logging, but can be practiced with success only in seed years.

Clear-Cutting in Strips.—Strip cuttings have been made in several different years. The cleared areas varied from 100 to 200 feet in width and in all cases were made on the margin of the stand away from the prevailing wind. The results have been variable. On well-drained sites, where the underbrush and small vegetation was scanty, good reproduction has appeared within five years. On moist or rich land pine has been entirely kept out by dense herbaceous growth.

Clear-Cutting in Patches. — The patches cleared by this method varied from 50 to 100 feet in diameter. The results have been similar to those on the cleared strips, although the reproduction has been, on the whole, more successful. Abundant seedlings have come in on the drier sites where the competition with woody vegetation was not to keen. This method, like the preceding, is open to the serious objection of greater cost due to the smaller, scattered area. Furthermore, even if the groups of young growth become established, it is difficult later to log the surrounding uncut timber without undue damage or expense.

The Selection Method.—Small areas cut over by the selection method where only single large trees or groups of trees were cut, have resulted in fair reproduction. It is not, however, a practicable means of handling pure pine, being too costly and not calculated to provide the necessary density and growing conditions for the new crop.

The Seed Tree Method.—All experiments with the seed tree method have proved failures. In many cases the trees blew down.

The Shelterwood Method.—Of all methods tested this has resulted in the best reproduction. The first cutting has consisted in a uniform thinning in which mainly the overtopped and defective trees were taken. This meant the removal of about one-quarter of the trees and one-fifth of the volume per acre. Up to the point where windfall becomes a risk the heavier the thinning the better was the reproduction. Stands so treated have in five years shown as many as 25,000 seedlings per acre. Where the overwood was allowed to stand more than five years the reproduction became stunted and too weak to recover promptly when the removal cutting was made.

A New Forest Ensured.

The cutting method now in practice on the Harvard Forest, though based largely on the outcome of the experiments above described, was adopted with considerable reference also to practical and financial considerations. The rotation for white pine is set at 60 years. As the working plan is based upon the principle of a sustained annual yield, final cuttings have to be made each year. In this respect the property is in the same case as that

of a wood-working concern which requires a steady annual supply. Since seed years for white pine occur not oftener than once in three years, this means that any cutting method based on the periodic fall of seed must make provision for securing reproduction after the operations of the off years. The established logging and milling methods almost necessitate the clear-cutting of a considerable area in one place a minimum of not less than 5 to 10 acres.

The method of cutting is a combination of preliminary thinning with clear-cutting. Each year an area large enough to yield the bulk of the annual cut is cleared, and ordinarily thinnings are made on adjacent areas in amounts sufficient to yield the balance of the total cut. The object of the thinnings is primarily to stimulate reproduction of pine so that it will be available when and where cuttings are made in non-seed years. Each year, however, the bulk of the operation is a clear-cutting which keeps the cost of the job within reasonable limits.

Before the final clear-cutting is begun all the advance growth, hardwood and underbrush, both small and large, is cut close to the ground. Usually this can be done with a bush-scythe and at a rate of an acre or an acre-and-a-half per man per day. The purpose of this is to eliminate misshapen and overdeveloped reproduction and to insure the uniform starting of straight, vigorous, seedling sprouts. Cost records show that the work is much more than paid for by a saving in the cutting and hauling of logs due to the much greater ease of handling and loading. When the logging starts the slash is burned in piles much of it in broken time while the job is in progress. The cost of slash burning has varied from fifteen to fifty cents per thousand.

A Commercial Ideal

"The ideal forest situation provides annual growth equal to the annual requirements.

"Forest Conservation and forestation will procure this ideal condition in time and the movement is under way."

The above is clipped from a full page advertisement of the International Paper Company of New York, the largest newsprint concern in the world. While the International Company has used the argument to point an arrow at Quebec's embargo on export of unmanufactured wood from the company's lands to their American mills, nevertheless the principle of systematic forest management and permanent timber crops is today thoroughly recognized by all progressive pulp and paper companies.

Water Over Sands

By Douglas Malloch, the Lumberman Poet.

Time slips away like water over sands,
So swiftly—silently, we scarcely know.
We ply our oar with fond and futile hands,
But with the current we must onward go.
The changing scent, strange faces on the shore;
A sudden ripple and a little strife;
And then the scene, the face, the strife, no more—
And this is life.

How far we come in such a little while!
Like water over sands time slips away;
How short the distance from a baby's smile
To age's wrinkles and a brow of gray.
If yesterday, today, are not the same,
Beyond this bayou is another bend;
And we shall find, and, finding, fondly claim
Perhaps a friend.

So hail him!—do not pass him—give a hail!
Behold each lily, ev'ry perfect thing.
To speed too swiftly down is but to fail,
There are such songs to hear, such songs to sing.
Yea, there are fruits and flowers, grass and tree:
Live while you may, while life is in your hands;
Time slips away like waters to the sea
Run over sands.



Mr. Sovez, of Alsask, Saskatchewan, refused to take the bare prairies as a visitation of providence and therefore beyond human remedy. This is how he establishes rows of evergreens to strengthen the belts of shorter-lived species.

For Every Prairie Farm a Tree Belt!

How the Sutherland, Sask. Nursery is Aiding Western Farmers to Improve Their Lands.

The value of trees as an ornamental feature of home surroundings in both urban and rural municipalities needs no argument or emphasis, but the additional value of tree-planting to the farmer in the prevention of soil-drifting should be known and appreciated by every agriculturist who desires to get the best return from his grain fields. The disastrous results in many prairie sections during the last two years occasioned by the high winds should make this subject one of vast importance to the farmer, and every assistance offered by the government should be taken full advantage of.

To help the agriculturists overcome this seemingly great misfortune which may any year attend their efforts, and to aid them in making their prairie homes assume the most attractive appearance, adding comfort as well as pleasure, the Dominion Government through the Department of the Interior, has established the Forest Nursery Stations, the chief of which is at Indian Head, Saskatchewan, and the most important branch at Sutherland, Sask. Comprising three hundred and twenty acres of average prairie land and operated under the superintendency of James McLean, this nursery station, serves the greatest need of the prairie farmer, who may more or less successfully cope with other difficulties, but who in the face of the soil-drifting problem finds himself helpless except as he takes advantages of the solution afforded through the planting of trees.

Founding of Nursery

The land for this forestry farm was purchased in 1912 and in the summer of 1913 was first plowed. Planting was commenced in the spring of 1914, so that six years is the maximum period of growth of any trees or shrubs to be

found there. A visit to the nursery is necessary in order that one may be convinced of what may be accomplished in six years.

From prairie land, or rather, land which had once been cultivated and later allowed to go back to prairie, has been developed in that time a most beautiful and well-equipped forest tree nursery. Attractive and well built farm buildings have been erected, and a handsome brick residence for the superintendent occupies a choice location in the park-like surroundings.

Primary Object

While the grounds and drives are laid out in artistic manner and garden shrubs and flowers are to be found in vast profusion, and a visit to the farm would furnish a valuable object lesson in landscape gardening, the primary aim of the nursery station is to supply free trees for rural home decoration, and to assist farmers in checking soil-drifting by the use of tree plantations. By tree-planting moisture in the soil is conserved, protection is given to fruits and vegetables which, without such protection, cannot be grown successfully, and the farm generally, through beautification and material benefit of plantations, takes on an added value. Any garden will give better results when protected from the wind, while the growing of strawberries, white, red and black currants, rhubarb, plums and asparagus is made possible in the most exposed sections of prairie when shelter belt plantations are used.

Forest Trees Only Supplied

Only forest trees are grown at the nursery for shipment, including maple, ash, Russian poplar and caragana, which are distributed free except for transportation charges, and Scotch pine, lodge-pole pine, jack-pine, and white spruce, which are supplied at the nominal cost of two cents per tree, in addition to the transportation cost.

Maples are shipped at the end of one year's growth, ash at two years', caragana at one to two years, and evergreens at from three to five years, an average of two million trees per year being the output since the founding of the station.

Distribution Over Wide Area

Trees have been sent to applicants throughout the three prairie provinces, and to districts ranging from Portage la Prairie on the east to Peace River on the west. All points which can best be served by railways out of Saskatoon receive their shipments while those which



Cabbages, carrots and mangels grown prolifically on the farm of Andrew Anderson, Alsask, Sask. Mr. Anderson owes his vegetable crops to the shelter obtained from belts of trees.



This progressive prairie farmer does not believe in importing his luxuries;; he grows them. The view shows a magnificent lot of raspberries on Andrew Anderson's place at Alsask, Saskatchewan. They were grown with the aid of shelter belts of trees, without which fruit culture on the bare prairies is a hopeless job.

are better served from Indian Head receive shipments from that station.

Naturally the shipments to points in the province far outnumber those to neighboring provinces, the new Canadians showing an ever-increasing eagerness to take advantage of the opportunity offered by the government to improve and beautify their farms.

Caragana Most Popular

The heaviest demand from all points is for caragana, or Siberian peatree, and the reason for this is because it is hardy and ornamental. Russian poplar is next in demand, being equally hardy and very quick growing, the actual growth per year averaging about two feet. Manitoba maple is next in demand, being quick growing, hardy and a good shelter. Willow is recommended for the same reasons. Green ash, while very desirable in many ways, is less called for than other varieties because it is slow growing. When matured it has an additional value in that it makes excellent timber.

Evergreens, while growing more slowly than deciduous trees during the first seven years, will after that time grow more rapidly than the deciduous varieties and so Scotch pine and Manitoba maple set out at the same time will, at the end of fourteen years, show the former to have attained the greater height. The great secret in planting evergreens lies in never permitting the roots to dry. If this happens the resinous sap solidifies and cannot be liquefied again.

Spruce Desirable

The white spruce is a very choice tree to plant in Northern Saskatchewan as it is absolutely hardy. The native tamarac is recommended because it is hardy, handsome, quick-growing and makes a good ground covering. This variety, however, can not be supplied from the nursery station, as but a limited forest has as yet been grown and these so far have been used for experimental purposes only. Native and Russian birch are also highly recommended for farm planting, but they, too, are only carried at the nursery for experimental purposes as yet. The golden willow, while a choice tree for appearance, shelter, etc., is, however, not as hardy in the northern latitude as the other varieties named above.

Forest Restoration Needed.

In the forest history of any country we find three periods, forest destruction, forest conservation and forest restoration. Canada is now in the second period —that of conservation and a lapping of the periods is seen in the fact that to a certain extent forest restoration is receiving considerable attention. This is a form of reconstruction of the greatest possible benefit to the prairie farmer and for his guidance and assistance the forest nursery station exists.

Trees Check Soil-Drifting.

The one big object in tree-planting is to check soil-drifting and when forest plantations are well-planned and carefully tended the loss of crop from this cause becomes negligible. A row of trees will protect more than a rod in distance for every foot the trees are in wide plantations in rows about fifty rods apart, and working the land in strips, drifting may be overcome entirely

Tree plantations also afford shelter from wind to crops, buildings and stock. Theycollect and hold the snow during the winters, preventing it from banking up around buildings. They preserve and retain the moisture in the soil by breaking the force of the hot winds in summer.

Timber From Plantations

Plantations will supply fuel, fencing material and wood for repairs, which is a very important point to many settlers who live far away from any natural supply of timber. Trees are of aesthetic value beautifying the landscape and making life on the prairie much more pleasant and less monotonous, and they add greatly to the money value of a farm.

As farm lands in the west become more thickly settled, a farmer to be successful must make every acre of his property produce the greatest possible revenue without deteriorating the soil. In the case of spots unfit for grain cropping, there is no doubt that the only way to obtain a revenue from them is to plant them up with trees. For a few years after planting, of course, no revenue can be obtained from a plantation, but the inital expense is not so very great and as an investment would pay good interest in the future.

Shelter Belts at Nursery

Some of the best shelter belt combinations are to be seen in the plantations at the forestry farm. One which commends itself immediately both for beauty and utility is the mixed deciduous plantation. This is a six years' growth of Manitoba maple, poplar, golden willow and caragana. The caragana is a yellow-flowered legume which has more the nature of a shrub than a tree, although it grows often to a height of thirty feet. With its dense growth it is an excellent wind-break, while its flowers make it highly ornamental.

Another plantation which is most strongly recommended for an outside shelter belt is to be found running the entire length of one side of the farm. It is composed of four rows planted four feet apart, showing six years' growth. The outside row is of Manitoba maple, the next of Russian poplar, the next willow, and the inside row of caragana. Some oft he maples in this plantation have reached a height of fifteen feet.

Tamarac Being Tried Out

One of the handsomest plantations is that of the native tamarac where the trees, three years old when planted, have been growing for the last six years. This plantation is being tried out experimentally and so far is proving successful, the saw-fly which has attacked it in other districts, not having made an appearance here.

The large plantation of white spruce makes a splendid showing and in their six years of growth in this plantation height of ten to twelve feet. The white spruce is one of the most useful trees from an economic standpoint. It is a most valuable lumber tree and is extensively used in the manufacture of pulp. For forestry purposes it will undoubtedly prove one of the most successful trees for western planting.

The plantation of Scotch pine, that, valuable European timber tree, has made rapid growth. Each year prairie farmers in increasing numbers visit the forestry farm in order to learn what may

be accomplished through tree plantations and to gain a first--hand knowledge as to how to care for a plantation. It is the aim of the nursery station to assist these as much as possible and Mr. McLean will take time to take any one over the farm and explain to him the leading features of the various plantations or will give him an interview in his office at any time.

Start Plantations Early

Most farmers, when they begin life on the open prairie, intend some time or other to plant at least a few trees to shelter their buildings and garden. Some begin to prepare for tree-planting as soon as they get on their land, others prefer to leave it until later, but nearly everyone has the intention, some time or other, of doing some planting. The forestry branch provides the farmer with trees and notes particularly the difficulties experienced by him in disposing of his plantations to the best advantage. Briefly summarized, the advice of the nursery station in regard to the question of successfully establishing plantations in the prairie may be stated thus.

Wide belts are better than narrow ones, better shelter, cheaper to maintain, furnish better material in after years and more of it.

Thorough preparation of the land must be made before planting.

Trees must be firmly planted.

Cultivate as soon as they are planted.

Cultivate in summer to conserve moisture. Do not wait for the weeds.

Any blue-joint grass or sweet grass appearing the first summer should at once be dug out.

Close planting saves labor in the long run.

Plantations should never be pruned.

Put the work of the plantation first. It does not take long and only about one-third of the work if done at the right time.

How Trees Are Prepared.

Application forms are supplied to all who desire trees for planting and all applications should be sent to Norman M. Ross, B.S.A., B.F., Chief of Tree-Planting Division, Indian Head. Upon the receipt of application by Mr. Ross, an inspector is sent out to the applicant's land to see that it has received the proper tillage. The inspector also makes a plan of the build-house. Following his visit the plans are framed and the farmer supplied with a plan showing the varieties and numbers of trees which he should plant.

Principles to be Observed.

The following guiding principles are laid down for formulating plans.

Make convenience the first consideration in arranging the farm buildings and grounds.

Establish the shelter-belt to protect the home and stock against the prevailing winds.

Allow sufficient room between the buildings and the shelter-belt for the extension and addition to buildings, threshing space, and to collect snowdrifts in winter.

Allow space for lawns and ornamental planting.

Allow for the extension of the plantation for wood-lot purposes.

The Forestry Branch cannot promise to furnish sufficient planting material to carry out any plan, but will lend all possible assistance in the way of making suggestions and will supply as many trees as are available for distribution.

WHERE THE PAPER GOES.

Some exciting figures appear in an article on American periodicals in the current Publishers' Circular. One issue alone of a certain popular journal, it is stated, would supply enough paper for all the books brought by all the United States public libraries in a year, two or three times over. Three of the periodicals combined use enough paper in a year to girdle the earth with a page-wide strip 148 times, and the ink used amounts to 3,600,000 pounds. The mere details of 13,000 miles of rope used annually in tying up parcels for delivery is thrown in by way of parenthesis.

Why Close the Timber Industries?

By Roland D. Craig

The effect of progressive forest exploitation, without provision for succeeding crops, is being felt in parts of the United States. At a bearing before the House Committee on Foreign Affairs in Washington, W. E. Haskell, of the International Paper Company, made the statement that "the Underwood Resolution, which provides for a commission to negotiate for the removal of existing export restrictions on pulpwood cut on the Crown lands of Ontario, Quebec, and New Brunswick, is the only measure yet presented to Congress which contains any assurance of a sufficient quantity of pulpwood to perpetuate the present production of our paper mills, to justify the installation of new machines, and to save the great pulp and paper industry of the United States."

This is not an accurate statement of the situation. The facts are: (1) The labour and manufacturing cost of converting pulpwood into pulp is very much less than the cost of converting pulp into paper. (2) The amount of water-power required to manufacture pulp is relatively high and, from an economic point of view, the benefit to the community would be increased if such power were used for other purposes. Further, it is notorious that, in the Northeastern states, this power is required for more important industries and its release would ameliorate the present coal shortage. (3) The paper mills of the Northeastern states can purchase pulp from Eastern Canada, the Pacific states, British Columbia or Alaska and with anything like present prices, can conduct their operations at a profit. Col. Haskell's statement, however, affords further evidence of the serious extent to which the forests of the Eastern states have been depleted.

A recent report of the Louisiana Department of Conservation shows that similar conditions exist in that state in regard to lumber, and points out that Louisiana should and must practise forestry, in order that she may not be obliged to pay $15 or $20 per thousand feet for freight on lumber brought from the Pacific coast twenty years from now, and because her vast unproductive areas of cut-over lands are a heavy drag upon her prosperity.

With these examples of the disastrous effects of such methods in the United States, Canadians should not wait until an actual shortage overtakes us before we learn the lesson so plainly demonstrated.

Re-creating a forest is slow and expensive, but its productivity can be maintained by comparatively inexpensive means. These consist of, first, protection from fire and, second, proper methods of cutting.

No single system of cutting is applicable to all conditions, any more than the growing of all kinds of farm crops, and technical knowledge of the requirements of the different species is necessary. Under some circumstances, more complete utilization of the mature timber will result in satisfactory reproduction. In others, seed trees must be left in order to secure the kind of forest desired.

The increasing quantities of British Columbia lumber being sold in Eastern Canada is evidence of the already growing scarcity of available timber in the East, and, if the immense pulp and paper industry which has grown up in the last decade is to be permanent, steps must be taken at once to make provision for future crops instead of leaving cut-over lands as barren wastes.

From A Western Physician, Oyen Alberta.

Canadian Forestry Association, Ottawa.

A word of appreciation for the good services of Mr. Arch. Mitchell, now connected with the tree planting car touring the province of Alberta.

I sincerely hope this work will continue; it's filling a long felt want in these prairie districts.

Dr. H. C. Swartzlander.

Rebuilding the Scottish Woodlands

By Col. John Sutherland, Assistant Forestry Commissioner.

Britain is the largest wood importer in the world, and it is a striking fact that so little effort has been made in the past to help to meet the demand for timber by increased production within the country. Greater Britain or the British Empire is potentially the largest timber producing unity among the nations. The almost unbounded resources which the Empire possesses in all parts of the world need only be scientificially developed and conserved in order to ensure our future supplies and to remove all apprehension of a timber famine. The Mother Country has undoubtedly lagged behind the Dominions and the Colonies in matters of forest production and conservation. Of her 121,380 square miles barely 4 per cent. has been under forest in recent times; still the earliest records show that once upon a time Great Britain was a densely wooded country. Forestry development has not kept pace with other industrial enterprise. Britain owes her supremacy to her insular position and to the development of her Navy and mercantile marine. Her many excellent ports and the ease with which timber could be brought from over the seas made it seem unnecessary to attend to home resources in timber supplies, but a visit to Scotland to-day will disclose the importance of never again being caught without an adequate reserve of all the natural resources which can be developed within our shores.

The upper plains, hillsides, and low-lying valley slopes, which five years ago were covered with trees, are now bare, and too often covered with the debris of the exploiters. This state of matters, while of the nature of a calamity, has not altogether been devoid of good. The War manifests the importance of timber and the necessity of securing within the country a supply of wood sufficient to make Britain more independent of other countries.

At one time the whole of Scotland, and especially that part lying north of a line drawn between Edinburgh and Glasgow, was covered with dense forest. To what altitude the forest grew is more or less a matter of conjecture, but traces of large trees are found at elevations of 1,600 to 1,700 feet, and in some ascertained cases even 2,000 feet above the level of the sea. The condition of the country, covered as it was by wood, protected the inhabitants from invasion, and while sheltering them, facilitated their raiding hostilities upon the Lowlands. When the Romans invaded in the third century they employed over 50,000 men in destroying and opening up the forests for the purpose of driving out the inhabitants who resisted their advance, and as indicative of the character of the land they called the people Caledonii, a name latinised by them from the Gaelic "Na Caoilldaoin," which means "the men of the woods."

The devastation of the forests was not confined to the invader, for the rival sects and clans, retarded in their conquering aims by the woodland cover of their neighbouring enemies, took means of destroying by fire wide forest tracts throughout the whole country. Also in Cromwell's time vast areas, especially in the Scottish Borders, were laid waste by fire for military purposes. In the early days also serious inroads were made by extensive fellings,—for example, in the time of Edward III., during the first half of the fourteenth century; in order to raise revenue for the prosecution of the French wars, Henry VIII, in the sixteenth century; James I, a hundred years later, and Charles I, all helped to reduce the forest area either for colonisation schemes or for the sake of revenue. Still it is on record that both Henry VIII. and James I. encouraged planting as an important factor in national economy.

The Forestry Commission Programme for Scotland is under review, but it is generally anticipated that during the ensuing ten years 75,000 acres will be planted by the State; that 25,000 acres may be afforested through loans or other schemes in co-operation with local authorities and private owners, and that a similar area may be restored to trees in

the woodlands exploited during the War. This programme envisages the afforestment of 125,000 acres altogether —no very vast encroachment upon the twelve and a half million acres of moor and waste and deer ground from which the land will be resumed.

At the outbreak of War not less than nine-tenths of the timber consumed in Scotland came from abroad. The Board of Trade Returns for 1913 gave 1,470,000 tons as the quantity of timber imported into Scotland. The total consumption of timber in that year is believed to have been about 1,623,000 tons, leaving as the balance provided by home woods only 153,000 tons or roughly one-ninth. More than one-half of the imports consisted of pitwood. As the result of the War and of the consequent compulsion to find our timber requirements at home the position has been completely reversed, and in this year nine-tenths of our requirements are supplied from home forests and one-tenth from abroad. The development of the home timber industry during the last five years has been enormous, but this development has been at the expense of the small reserve of old woods, and it is feared that large inroads have been and will continue to be made as well into the younger plantations. If the timber industry is maintained, and there is reason to expect that it will be for several years, a further serious depletion of the timber resources must result, but the industry is important and one well worth retaining in as full activity as the existing resources will allow. About 100,000 people were engaged in it in 1911, and as the fruits of afforestation accrue the expansion of timber work will increase.

The Timber Supply Department created during the War made a calculation of the fellings from 1914 to 1919 inclusive, and these totalled 170,233 acres, but it would not be unreasonable to place the actual inroad upon the woods to date at something like 200,000 acres, which would leave 652,120 acres as the area of woods remaining in situ at the present day. Of this area probably 25 per cent. or 163,000 acres will consist of coppice, the greater part of which is presently of but small marketable use, so that the real reserve of standing timber in Scotland at the birth of the Forestry Commission may be roughly computed at half-a-million acres or 2.6 per cent. of the whole extent of the country. The above estimate of reserves will ultimately be checked by accurate methods when particulars of all woodlands are properly investigated by the Forestry Commission.

MEMBERSHIP APPLICATION

CANADIAN FORESTRY ASSOCIATION,

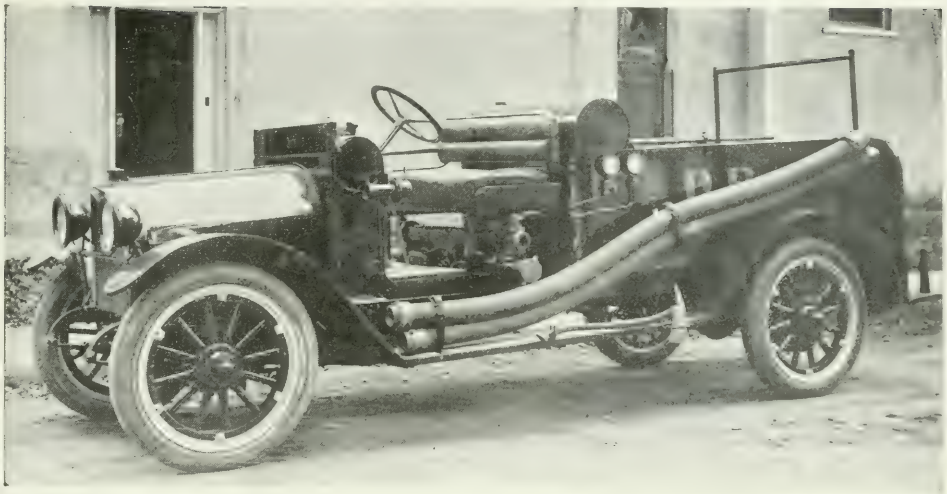
JACKSON BLDG., OTTAWA.

Please make me a member of the Association and send me 12 numbers of the Illustrated Forestry Magazine, containing Special Articles on Canada's Forests, The Planting and Care of Shade Trees and other allied topics. Membership Fee $2.00, which includes subscription to the Forestry Magazine.

Name

Address

("Print" the name please.)



Developments in Fire-Fighting Equipment

by G. Gerald Blyth, Assistant Secretary
Canadian Forestry Association.

The Dominion Parks Branch, which was responsible for the introduction of the light weight portable gasoline fire-fighting units now so universally and successfully being used both in Canada and the United States for fighting forest fires has followed up this light weight pumping unit by a heavier type of gasoline operated pump which has just been built by a Canadian firm for use in the valleys, along main roads, in Western National Parks. Much has been written describing the construction and use of the portable units, and the purpose of this article is to convey to these interested in forest fire protection a slight idea as to the type of the experimental unit just completed which will be ready to handle the fire situation along the main auto roads in Rocky Mountains Park next spring.

Strangely enough, the more difficult problem of dealing with forest fires which occur off the main and auxilliary roads was first dealt with and more or less solved; that is to say, the portable gasoline pumping units have preceded the heavier and less mobile type. Those departmental offices who were responsible for the introduction of the gasoline pumping units were more concerned with providing means of getting water to a fire occurring in the less accessible districts and hence the portable gasoline pumping unit, weighing but 130 lbs. was the product of their lengthy and careful investigations. Having produced an eminently satisfactory unit capable of being easily transported by canoe, pack-horse, railway speeder, etc., the attention of the Parks Branch Officers was next directed towards dealing with the fire situation along the many miles of recently constructed auto roads where a much heavier type of unit could be used which would deliver a greater quantity of water through longer lines of hose.

Automobile Pumping Units

A three-quarter ton auto truck chassis of an approved make was fitted at a well known Canadian fire engine company's factory with a rotary pump which was placed in position on a line with the chassis, behind the chassis transmission and suitably geared thereto. The pump

can be thrown into gear with the engine of the motor truck and water obtained in twenty seconds. It is intended to use standard two and a half inch fire hose of the linen and unlined type which is much lighter in weight and consequently much more suitable for forest fire protection work.

The completed unit is practically identically the same as the ordinary city fire pumping trucks, however, many of the frills and decorations usually found on these have been omitted and only equipment is carried.

Specifications.

Pump—Rotary type, capacity as follows being the result of the final test:—

Tip used.	Vacuum.	Pressure.	Pressure at Tip.	Calls per minute.
¾″	7″	125/130 lbs.	125 lbs.	137
1″	10″	60/65 „	55 „	219
2x1″	12″	30/35 „	50 „	340

The initial or experimental unit now going forward to Banff, Alberta where it will be stationed, will be available for use over an extensive highway system in the Rocky Mountain Park where water is obtainable along almost the entire road system. This unit will be able to cope with fires occurring within a distance of 2,000 feet of the roads and when it is necessary to deliver water for a greater distance it can work in conjunction with the portable units, this making it possible and practicable to deliver water a very considerable distance from the source of supply.

Much credit is due the Dominion Parks Branch for the pioneer work they are doing in developing mechanical forest fire-fighting equipment.

Slogans for Smokers.

Don't drop FIRE when you smoke in the woods, nor throw it out along the road. Keep the forests GREEN.

DANGER! Matches, pipe coals, cigar stubs and cigarette ends start many forest fires. Help protect woods, streams, scenery.

BE CAREFUL! Don't start a fire in the woods when you begin or end your smoke. Be sure your match, cigarette, or pipe is out.

DON'T START WHAT YOU CAN'T STOP! Be careful with fire in and near the forest.

FIRE IS DANGEROUS! Be careful when you smoke in the woods.

LOOK OUT! When you smoke in the woods, don't start a forest fire.

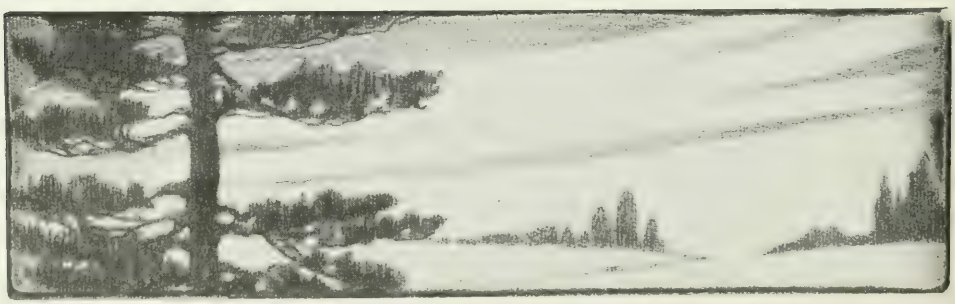
YOUR CO-OPERATION with the company to keep down forest fires is asked. Break your match in two. Knock out your pipe ashes into your hand. Don't drop a burning cigarette.

FOREST FIRES cost millions a year. Don't start one.

DON'T THROW FIRE AWAY in the woods or along the road.

Red Forests of Red Russia.

Washington, D.C.—A dispatch received by the Department of State from Soviet Russia indicated great harm to the pulp and paper future of that country through extensive forest fires, which are not being checked.



Flying Studies of Forests and Insect Damage

If the Air Board of Canada can give a few more demonstrations of the time-economy of aircraft, such as occurred recently between Ottawa and Haileybury, Ontario, the stimulus to civil aviation will be materially strengthened.

Col. Robert Leckie, D.S.O., M.C., D.F.C., Superintendent of Flying Operations, Air Board, Ottawa, Mr. Clyde Leavitt, Chief Forester, Commission of Conservation, Ottawa, and Dr. J. M. Swaine, Chief of Division of Forest Insects, Entomological branch, Dept. of Agriculture, Ottawa, comprised the aerial party.

The plane left Ottawa at ten o'clock, a.m., following the Ottawa River to Mattawa, thence to North Bay arriving at 1.15 p.m. where a stop was made for dinner and a fresh supply of gasoline. At 2.45 the air travellers left North Bay, returning to attawa Mto follow the Ottawa River again, as far as Kippewa and up Lake Temiskaming, reaching Haileybury at 4.20 p.m. The actual flying time was five hours, at an average rate of 65 miles per hour. The engine is a 350 horsepower, twelve cylinder V type, stationary Liberty motor, and was used by the Naval Board during the war. The airship carries tanks with a capacity of 100 gallons of gasoline sufficient for about five hours constant flying. Her rate of consumption is 28 gallons of gasoline an hour.

The party was met at Haileybury by Capt. Wickens, deputed by the Air Board to operate the machine, while it is in that district, and by Mr. Roland D. Craig, Forest Engineer for the Commission of Conservation and Major G. H. Edgecombe, who are conducting a survey of the forest resources in Ontario, with the view of finding out the present and possible future supplies of timber from which the pulp and lumber industries of the province can be supplied. This work is under the direction of Mr. Craig, who conducted similar surveys in British Columbia. Major Edgecombe and Mr. A. V. Gilbert are also engaged in collecting the necessary information for this survey.

During the war the value of aircraft for mapping and reconnaissance was demonstrated, and now a number of planes are being used for this in forestry work in Canada.

The Air Board having been given over 100 machines of different types by the Imperial Government, is co-operating with the other Government departments by supplying machines and pilots for such work as mapping, forest fire protection, fisheries patrol and transportation.

Taking advantage of this opportunity, Messrs. Craig and Edgecombe are going to make reconnaissance of the forests in the Temiskaming district from the air, in connection with Dr. Swaine's Spruce Budworm studies.

The advance of the aerial survey is that it enables the observer to map in, with considerable accuracy, the various types, such as swamps, burns, hardwoods and softwoods, in a few hours on an area which could not be covered by a ground survey in as many months. It is not claimed that the amount of standing timber can be judged from the air, but with the area defined, a comparatively small amount of ground work will give a very satisfactory basis for a timber estimate.

Dr. Swaine is studying the injury caused by the outbreak of the spruce budworm which is spreading into Ontario pulpwood forests from Northern Quebec. The injury is to the balsam and spruce timber, and is caused by myriads of caterpillars devouring the foliage. The injured timber turns red and may be distinguished from the air. It is planned to map this area, and the timber owners can then be advised of the rate and direction of the spread, so that they may salvage their timber in advance of the outbreak.

Immense destruction has been caused by the spruce budworm in the Provinces of Quebec and New Brunswick, and this sudden extension of the outbreak into Ontario threatens all the spruce and balsam timber between Lake Temiskaming and the Great Lakes. In conjunction with the air suhvey, detailed entomological studies are being made by ground survey.

The plane and party remained in the north for about three weeks with Haileybury as the base. Col. Leckie returned to Ottawa in preparation for his flight across the continent from Halifax to Vancouver. On this trip he will come north as far as North Bay travelling from there in the direction of Georgian Bay and the Great Lakes. He was much taken up with the country covered yesterday, and describes the Ottawa valley as a "wonderful sight" from the air.

Apart from their baggage, the flyers brought some personal mail from Ottawa to Capt. Wickens and Mr. Craig, which marks the first time in the history of the north country that mail has been brought by aeroplane.

British Subsidize Home Building

The British Government is making a free offer of £260 to anyone who will undertake to build a house. The builder can occupy it himself or let it to a tenant. He can, if he likes, when it is completed sell it, for the grant carries no irksome conditions, it is not repayable and becomes in fact absolutely the property of the owner. The building must of course conform to official regulations, it must be approved by the local authority, but beyond that approval the grant is free. It is paid in check without delay when the building is completed. It makes house building, even in these difficult times, both possible and profitable, especially when the builder intends the house for his own occupation. The object of the grant is, of course, primarily to encourage private persons to build houses for themselves and thus relieve the enormous pressure placed on the local councils.

No "Bare Prairie" for This Man

(Calgary Herald.)

If there was anything that was missing in the drive to two miles south of Coaldale, it was the trees in that varying landscape of green. But the rich vegetation on all sides obliterated all thought of trees until their presence, in making the home and the farm beautiful, was realized when the excursion arrived at the farm of John Hamilton, one of the C.P.R. readymade farms. Whatever wonderment was previously sensed in the rich and varied verdure of crop and grass was for the moment swept aside in the sight that greeted the visitors of a farm which for appearance would be hard to beat in any of the old settled farm districts. It was astonishment of a new kind that was aroused when it was realized that what is now a well cared for farm, that might have been inhabited by a generation of farmers, was only seven years ago a part of the bald prairie. The beautiful ring of trees which encircled the home plot of the farm looked as if it had been there for a period of years, and yet the trees were only planted in 1916, four years ago; and then in slips of nine inches or so long to grow into what now are trees rising in height to some fifteen and twenty feet. And all this, together with the rich fields of wheat and the alfalfa stacks in the farm, obtained by irrigation wisely applied. The astonishment grew when it was ascertained that this carefully and richly cultivated farm of 320 acres was the outcome of the labors of one man with the help of a hired man.

The farm of Mr. Hamilton is a triumph of the virtues of irrigation. The windbreak, with its six rows of trees, Manitoba maple alternating with ash, with willow and Russian poplar, making the two outer circles, was the perfection of the windbreak trees can afford. On the inner side of the circle of trees all through ,skirting the home farm, is a well trimmed hedge of caragana. In the enclosure is an ideal kitchen garden, the pride of the lady of the farm, Mrs John Hamilton.

New Forests for Nova Scotia's Barrens

by Freeman Tupper, Acting Woods Manager,
Macleod Pulp and Paper Company.

In looking over the forestry maps of Nova Scotia one cannot help but be impressed, and, if a lover of the forest, saddened, at the large percentage of the colour representing barrens. Still more will one be impressed, and saddened if he should traverse these barrens, and see the vast extent of waste, multitudes of valueless bushes, and huge pine stubs reminding us of the untold wealth which should have enriched our people. "Our Heritage" swept away in a moment!

The passing of this heritage was keenly felt by the older generation who remember the "forest primeval." Its far reaching effects pass on to the present generation, who, having a better perspective, are beginning to realize what the appalling loss really means. It is true we have some timber in sight which is being depleted by loss from windfalls and lumbering operations, and fires are still a common occurrence. Therefore, if the present generation do not endeavour to guard what we already have, the future generation will drink the bitter dregs, and the loss will be nation wide.

Many of our barrens have been visited by prospectors, seeking a hidden wealth, but they only succeeded in a small degree. Farming is out of the question, so it is evident that the only thing left for these lands to serve the public welfare is forests.

Considering the barrens of Queens County, particularly those along the watershed of the Liverpool river and head-waters, to be a fair average of barrens throughout the province, there are a few facts regarding them which should be brought to the public attention.

Some six or seven years ago, while conducting certain surveys, I had occasion to visit many sections of barrens in Queens County. They were indeed a treeless waste, but are varied in nature owing to repeated fires over portions, so that the original burned areas can now be divided into three distinct classes:

Class 1.—Open Barrens, devoid of trees or stubs, and in some places with sufficient soil to cover the rocks.

Class 2.—Portions of barrens covered with myriads of burned trees and windfalls.

Class 2.—Portions of barrens not burned since original fire, now covered by forest of young hardwood.

During the fall of 1919 and spring of 1920, I renewed the surveys mentioned above. We were amazed and delighted to see the change nature had wrought in a few years. Spruce, red and white pine were growing by the thousands over sections of classes 1 and 2. Even on portions of Class 1, where the soil had been burned exposing rocks and boulders, where modern forestry would perhaps hesitate to replant, were also red and white pine from ten feet down, all growing in a perfectly healthy condition.

What Nature is doing on these barrens of Queen's County at the present time, and on many other portions of barrens in the Province where my interest in the matter led me to visit, is exactly in line with the policy of

Government a vast sum of money in replanting. It means that our heritage is returning; a new forest is born to enrich our country in a future time.

There are still large portions of barrens not seeded as yet, but if these conditions exist on average barrens today, is it not reasonable to believe that other portions will re-seed as years go by?

It would be a crying shame for another fire to destroy this grand contribution, which Nature is again giving to us, and I hasten to make an appeal in behalf of these young trees for protection—for a Provincial Forester to direct affairs and intelligent Rangers to trail carless sportsmen, who do not realize the possibilities of fire.

Forest conditions effect everybody, and to avoid a forest famine in the future, we must act now. The Government must spend some money on them, and every businessman in the Dominion of Canada should be a member of the Canadian Forestry Association. Once their shoulders get behind the wheel of forest protection, give it a push and keep it going!





These pictures illustrate the good work done by rangers patrolling the Cochrane district of Northern Ontario. They have persuaded settlers to pile their slash for safe burning. In such hazardous country an ounce of prevention is worth a ton weight of cure.

Practical Training for Foresters

by Dr. C. D. Howe, Acting Dean,
Faculty of Forestry, University of Toronto.



Three quarters of total time of attendance is spent in field and laboratory.



As has been pointed out in preceding articles, the students in all forestry schools gain practical experience in the bush, forest nursery or mill during the summer holidays and at the same time earn money for the partial payment of their school expenses. The total time thus employed during the three summer vacations of the course amounts to ten or twelve months. Thus quite or more than one quarter of the time during the course is actually given to woods work. While the school is in session the students' time is about equally divided between attendance upon classroom lectures and upon laboratory or field work. It will be seen, therefore, that during the entire four years of the course the students spend three quarters or more of their time in practical work in some form.

In the Practice Camps

The statement in the paragraph above includes the work in addition to the time spent in the practice camp, since the students of all the forestry schools spend from one to three months in the forest under the direct supervision of their instructors. At this time they put into practice as far as possible the things they have learned in their textbooks. In the first place, they usually lay off the boundaries of their practice area and divide it into working sections. The students construct a map showing twenty-five or fifty or one hundred foot contour intervals. This, of course, discloses the topography and drainage and thus indicates where the hauling roads and camps may be conveniently located. The next procedure is to make a forest type map which locates, for example, the pure stands of hardwoods and softwoods and the mixed stands of these species. It also shows the distribution of the barrens, burns, swales and muskegs if present. The students then estimate the timber on the tract in terms of board feet or cords for each commercial species. This is usually done by establishing a base line and measuring the trees in parallel stripes at definite intervals apart and perpendicular to the base line. The strips on which the trees are measured are run methodically on the tract, so that the final estimate of the stands is a fair average. The students, however, obtain practice in various other methods of estimating as employed in the different parts of the country.

Planning the Future

All this data is placed upon the map of the tract so that one may see clearly the topography and drainage, the location of the logging roads and camps, the nature of the forest types and stands and the amount of material that may be cut in the form of saw logs, pulpwood or cordwood. These are about all the facts with regard to the condition of an area that a lumberman needs for the purpose of logging, but the forester must enter into the condition of the future productiveness of the area, for it is his business to maintain the continuity of the crop. In order to find out the condition of the tract from this standpoint, he must do two things: he must determine the amount of material not yet of merchantable size and having done this he must determine how fast it is growing, or in other words, how much wood in board feet in addition to estimating the amount of material now merchantable on the practice area. The forestry students by means of the data

obtained from regeneration and growth study surveys make estimates of the probable yield at stated intervals in the future. This involves not only a stock-taking of the young growth, but also the determination of the probable death rate as the stands pass from youth to maturity and this in turn involves, among other things, the making of forest disease surveys.

In order to keep an area continuously productive, provision must be made for the reproduction of the merchantable species at frequent intervals. The natural mortality is very large in a forest and, therefore, there must be an abundance of young trees coming on if the continuity of production is to be preserved. The natural regeneration of the forest is precarious and uncertain and the necessary conditions are not well understood. Yet the study of such conditions forms an interesting and very important part in the formation of plans for an unending supply of pine saw logs or spruce pulpwood as the case may be.

Studies of Fire Protection.

There is little need of making plans for the future supply of timber on an area if, as is unfortunately the case in some of our best timbered regions, the area has practically no chance of escaping destructive fires. An essential part of the forestry students' work in the practice camp is to work out the details of an adequate system of fire protection. This includes the locating and building of trails and telephone lines.

The work outlined in the preceding paragraphs covers the main things accomplished by forestry students in a practice camp. In the end they have the knowledge and the data necessary for the making of working plans for the tract, plans that extend a long way into the future and if carried out by the owners of the land would result in a supply of saw logs or pulpwood so long as the sun shines and the rain falls, for wood is only solidified sunshine and water with a few mineral salts from the soil thrown in for seasoning. The forester uses his intelligence to direct these processes of nature. Under a let-alone, do-nothing policy there is no direction and there will be no future supply—at least sufficient to meet the present demands on the present commercially valuable species.

The Character Equation

In concluding the outline of undergraduate courses in forestry, the writer wishes to say that in his belief no forestry school can make a trained forester. That comes only with experience accompanied with discriminating judgment. The forestry school does, however, attempt to train the mind of the student so he can use it to his advantage and that of his employer in whatever circumstances he may be placed. To develop in the student an active resourceful mind and the capacity for sustained intelligent thought and persistent hard work is the goal toward which the forestry schools constantly strive. A forester can be made only in the forest. It is the function of the teacher to point the way, to lay the foundations. What way he takes, what he builds on those foundations depends very largely upon the man himself.

THE STRENGTH OF TREES

Few people have any idea of the strength of trees. In Boston, Mass., recently, an old elm, more than three feet in diameter, had to be removed from the common. Several of its limbs had been struck off by lightning, and it was supposed to be in a dangerous condition. So one of the tree-levelling devices used in France for tearing down buildings, trees, etc., was brought into play. This is a machine that is worked by a couple of men moving a lever back and forth. A cable was fastened to the tree trunk, and it should have come up by the roots, all theory being correct. Instead, it broke the first cable of steel—one inch thick— and then, when two were wound around that old trunk, the tree shivered a bit and broke them. The contractor gave it up as a bad job, and put several men on with axes to cut the roots.

A Chinese trust controls the dye used on firecrackers, made from cibucao, a Philipine wood. The same dye is used for sealing wax and Chinese ink.

Prairie Planting

(Manitoba Free Press Editorial.)

There is no reason why the prairies should remain bald and treeless in practically any part of western Canada. Trees an be grown and grown quickly if the proper methods are followed. Remarkable results can be attained in ten years in establishing tree belts that will act as windbreaks, stop drifting, and control moisture evaporation. A visit to the federal government plantations at Indian Head, Sask., will be a revelation and an inspiration to western Canadians who have an idea that Providence decreed that this should be a treeless land. Providence meant nothing of the kind. Nature is doing her best to clothe the western plains with trees. The tree belt, in the natural course of events, is steadily travelling westward.

The whole landscape of the western plains could be changed in 25 years by intelligent and systematic forestation. Trees are an asset so easily accrued that the planting of them should no longer be neglected. Now is the time to begin.

Lumbermen and Pulp Manufacturers Attention !!

WE HAVE UNEXCELLED FACILITIES FOR HANDLING LARGE LINES OF INSURANCE ON LUMBER AND PULPWOOD

ALSO PULP AND PAPER MANUFACTURING PLANTS

The E. A. WHITEHEAD CO. LIMITED

INSURANCE BROKERS

509 LEWIS BUILDING
MONTREAL

The Belgo Canadian Pulp and Paper Co., Limited

Shawinigan Falls, Que.

- NEWS PRINT -

Groundwood Pulp
Sulphite Pulp
Lumber

Railways - Canadian National
Canadian Pacific

H. Biermans, Gen. Mgr.

Mention the Forestry Magazine for your identification.

British Columbia Will Maintain Its Forests

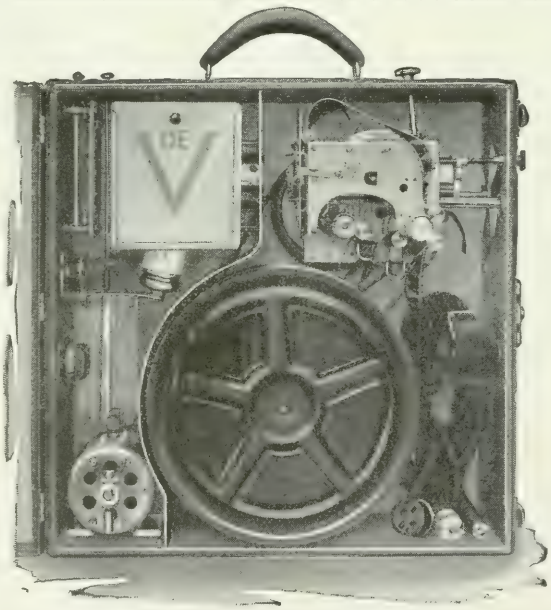
By Hon. T. D. Pattullo, Minister of Lands

How much merchantable timber have we? This question is being asked today the world over. While I write, an Imperial Forestry Conference in London, England, is trying to find the answer, so far as the British Empire is concerned.

To the south of us, State Foresters and timber experts are seeking to provide Congress with an answer to the same question, as well as answers to further questions arising out of the leading query.

There has been considerable controversy in the various trade journals both as to stands of timber and the best methods of handling them economically. One expert makes an estimate, and another immediately produces widely different figures. That the experts differ is not the important point—that they are both making a genuine effort to arrive at a fair estimate is the vital fact.

One of the good results of the war is that a general stock-taking of natural resources is going on, and it has been found that this is particularly necessary in regard to timber. After four years of destruction, during which ordinary work was at a standstill, the world is hungry for timber and its products. How long will our visible supply of raw material last? Frankly, we do not know. Fortunately, we are trying to find out.



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG

Mention the Forestry Magazine for your identification.

It has been a habit for years past to think and speak of our timber resources as being unlimited, with the result that we have been mining instead of cropping it, as is done for instance, in Sweden, where every available stick of timber is utilized. The unlimited supply idea has depleted Wisconsin forests; has left very little timber in Michigan, and is rapidly depleting the stands in the Southern States. It is estimated that the original stand of 650 billion feet in the Southern States has been reduced to 139 billion feet.

There is no occasion for hysteria, but we, in British Columbia, must look facts calmly in the face and lay our plans accordingly. We must, after careful survey, decide on the best methods of timber conservation.

Much is being said these days of reforestation and extensive experiments along this line are being made by some of the large pulp and paper companies in Eastern Canada. Experts are not agreed that the hope for the future lies entirely in reforesting. They seem inclined to the belief that it will prove rather as an assistance to the forest to reproduce naturally. In other words, that natural reproduction of the species native to each locality is the goal to be aimed at, but that, where necessary, nature should be helped out by artificial means.



Mention the Forestry Magazine for your identification.

RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

In natural reproduction and rapid growth, the coast of British Columbia is peculiarly fortunate, thanks to her moist climate and mild winter. It is estimated that we have 97,000 square miles of productive forest land and that on most of that area young timber is growing after previous destruction of the crop by fire and logging. While it is true that much of this young forest is at some distance from present means of operation, by the time it has reached maturity distances will have been shortened, as they are being steadily shortened year by year. The important point is that the timber is there, while it is equally important that it should remain there.

1,000 MILES OF FOREST PER ANNUM.

The newspapers of the United States and Canada consume 2,150,000 tons of newsprint annually. Stated in this way, it probably conveys little information to you respecting the effect upon our forests. You will better appreciate the situation when I say that it represents the denudation of the mature trees on an area of 1,000 square miles of forest land each and every year. This will give you an idea of the enormous inroads that newsprint manufacture is making upon the forests of North America.—*James White in address to the Vancouver Rotary Club.*

Shade Tree Planting

(Parry Sound Star)

Several gentlemen interested in the beautifying of our town, held a bee on Tuesday of this week, and planted about 18 trees. The work was well handled and there is no doubt but that the large majority of these will mature. The trees were kindly donated by Mr. John Argue and taken from his property. This is go-ahead business.

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks
Montreal."

MONTREAL, QUE.



Communication

What is it worth to you?

Prompt—"On the Dot" Communication—that keeps your Mill and Woods Department in touch with your office in all weathers.

Uninterrupted communication between your Fire Rangers or Aeroplane Patrols.

MARCONI WIRELESS

Telegraphs
and
Telephones

MANUFACTURED, INSTALLED AND OPERATED BY

The Marconi Wireless Telegraph Company of Canada, Limited

Vancouver
Winnipeg
Toronto

11 St. Sacrament St.
MONTREAL

Halifax
St. John's
Nfl'd

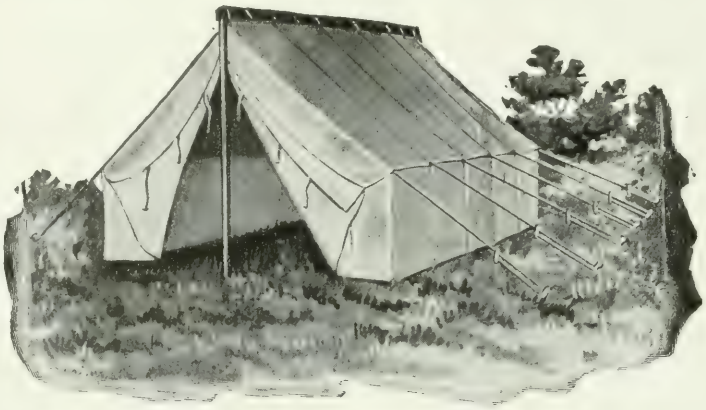
Mention the Forestry Magazine for your identification.

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

OTTAWA
CANADA
Dept. D.

Our Embargo on Raw Wood.

(By Col. H. S. Graves, former Chief Forester of U.S.)

"It should be wholly unnecessary to have any serious difficulty over this question. Canada's position is that the total amount of pulpwood in these Eastern Canadian Provinces—Quebec, Ontario and New Brunswick—is not more than is required for the support of the industries already established or which it is desired to have established in the future. Canada asserts that she is unwilling to sacrifice her own industrial interests merely to extend the life of an American industry which has overdeveloped its manufacturing facilities in relation to its raw materials and progressively destroyed its forests."

Colonel Graves suggested that the two countries ought to work on a joint plan for fostering the forest industries on both sides of the border, and he proposed a conference of representatives of Canada and the United States to work out a plan of mutual assistance. He urged modifications of the laws of New York so as to permit the use of some pulpwood from State lands where cutting is now prohibited, and a joint effort by the two countries to perpetuate their forests.

Laurentide to Install Wireless.

Plans are being discussed at present concerning the installation of a wireless telegraph station in the plant of the Laurentide Co., Grand Mere, P.Q., probably under the supervision of the Forestry Department, for the purpose of communicating with the company hydroplanes, and also to receive messages from the planes in emergencies. Both machines have wireless sets.

The JOST COMPANY, LTD
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

ATTENTION ! **Fire Equipment, Limited,** is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best. Send for samples and catalogues.

FIRE EQUIPMENT LIMITED

244 Notre Dame Street West : : : Montreal.

Timber from insect or fire killed trees is just as good for any structural purpose as that from live trees of similar quality, providing the wood has not been subsequently injured by decay or insects. Market dead trees before they suffer injury.

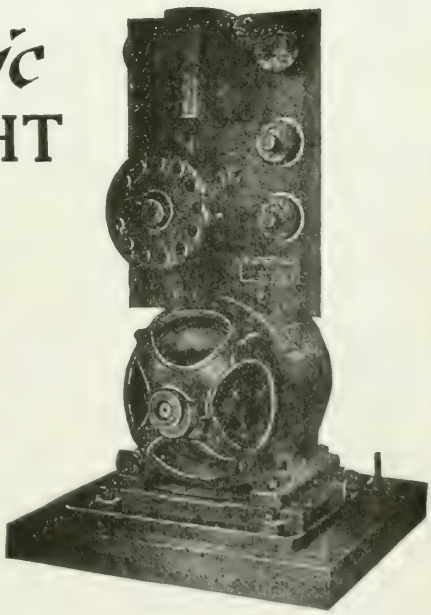
Shade trees may be destroyed by leaky gas mains, which poison the roots, making it impossible for the tree to secure nourishment from the ground. Gas killed trees are often thought to have been killed by insects, and weakened trees are often completely killed by borers or by fungi.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

Mention the Forestry Magazine for your identification.

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings — Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber **and pulpwood limits.**

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." **Telephone: Main 3281.**

Mention the Forestry Magazine for your identification.

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

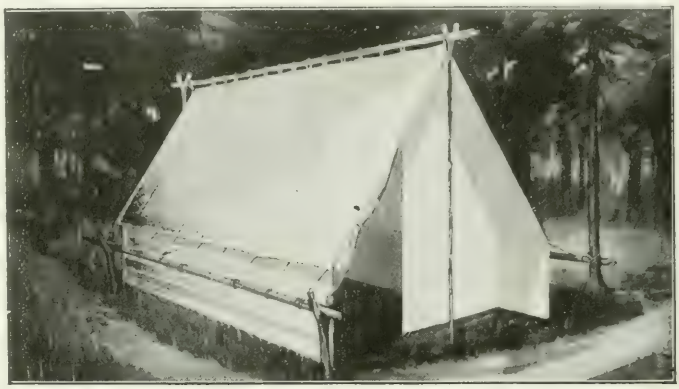
Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL **Old Town, Maine.**

Mention the Forestry Magazine for your identification.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country
Very Easy Bleaching Sulphite
Spruce, Pine and Hemlock Lumber
Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Mention the Forestry Magazine for your identification.

Paper-Making in Canada

By A. L. Dawe, Secretary Canadian Pulp and Paper Assoc.

Paper has been made in Canada for more than a century. From he records that are available at the present time it would appear that the credit for the first paper mill belongs to what used to be known as Lower Canada. Bouchette's "Topography of Canada" states that Canada's first paper mill was established at St. Andrews, Quebec, in 1803. It was ,from all accounts, started by a party of Americans who obtained concessions from the seigneurs. The second mill in Lower Canada appears to have been established at Bedford Basin, near Halifax, in 1818, by R. A. Holland, publisher of the Halifax Record.

In 1825, in a little village known as Crook's Hollow, was erected the first paper mill in what was then Upper Canada. This was a small building, about 30 x 40 feet, in which paper was made by hand. To Mr. Crooks, its founder, belongs the distinction of having earned a bounty of £100 offered by the Government for the first sheet of paper manufactured in Upper Canada.

Simultaneously, on the banks of the Don River, a few miles from Toronto, John Eastwood and Colin Skinner were working to obtain the same honor. They succeeded in producing paper just a few days after James Crooks, so close, in fact, that the Government rewarded their efforts by remitting the duty on the paper-making appliances which they had imported from the United States.

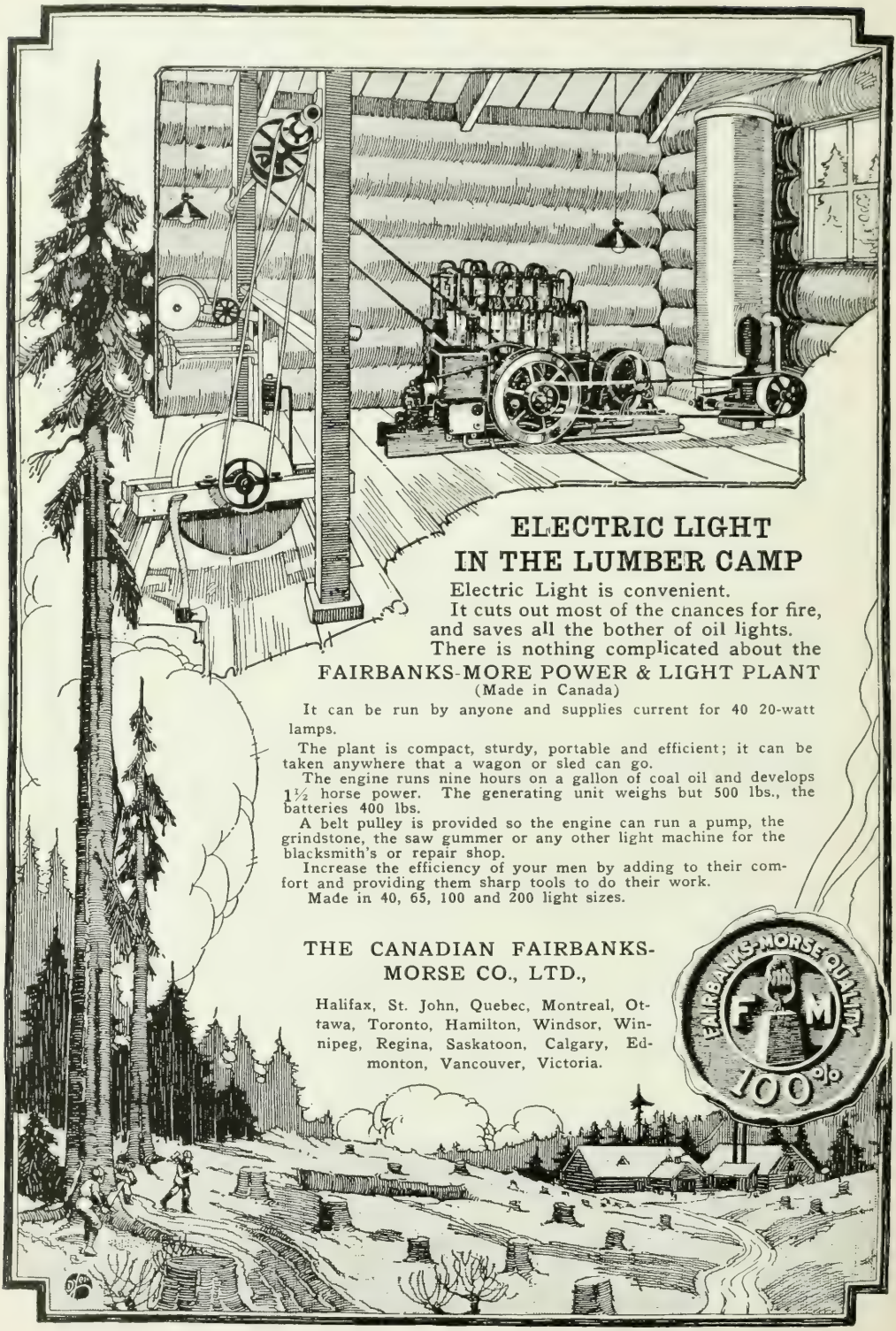
The subsequent history of the pioneer efforts is not recorded. Little development appears to have taken place until 1840, when the brothers Taylor erected a mill in the same neighborhood. This was expanded by the addition of a second mill two miles above the first, and later by a third. These mills manu-

BROMPTON PULP and PAPER COMPANY, Limited

EAST ANGUS, QUEBEC

MANUFACTURERS OF
NEWS PRINT PAPER
KRAFT PAPER
FIBRE PAPER
MANILLA PAPER
BOX BOARD
SULPHATE PULP
GROUNDWOOD PULP
and
LUMBER OF ALL KINDS

Mention the Forestry Magazine for your identification.



ELECTRIC LIGHT IN THE LUMBER CAMP

Electric Light is convenient.
It cuts out most of the chances for fire, and saves all the bother of oil lights.
There is nothing complicated about the

FAIRBANKS-MORE POWER & LIGHT PLANT
(Made in Canada)

It can be run by anyone and supplies current for 40 20-watt lamps.

The plant is compact, sturdy, portable and efficient; it can be taken anywhere that a wagon or sled can go.

The engine runs nine hours on a gallon of coal oil and develops 1½ horse power. The generating unit weighs but 500 lbs., the batteries 400 lbs.

A belt pulley is provided so the engine can run a pump, the grindstone, the saw gummer or any other light machine for the blacksmith's or repair shop.

Increase the efficiency of your men by adding to their comfort and providing them sharp tools to do their work.

Made in 40, 65, 100 and 200 light sizes.

THE CANADIAN FAIRBANKS-MORSE CO., LTD.,

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.

FAIRBANKS-MORSE QUALITY 100 p.c.

factured manilla, news and felt paper, respectively. Only one of them is in existence to-day. It is the flourishing property known as the Don Valley Paper Mills.

The establishment of the third mill in Upper Canada, in 1853, is notable for the fact that it marked the entrance of the Barber family into the paper industry, a connection which has lasted for more than half a century. This mill is standing in the same spot to-day, and is the Georgetown mill owned by the Provincial Paper Mills, Ltd. In 1858 a second paper machine was installed. It was supposed to be a marvel in efficiency. A story is told that when James Barber, who had charge of the paper-making end of the business, was informed that the new machine was running 100 feet a minute, he was so astonished that he would not be convinced until he had timed it with his own watch. It does not need much imagination to picture the growth of the industry when one contrasts this with the speed of to-day's machines, some of which run at a rate of from 600 to 1,000 feet a minute.

The Riordon Beinnings.

Established in 1857, ten years before Confederation, the Riordon Pulp and Paper Company, Ltd., forms an interesting chapter in the history of paper-making in Canada. It was in this year that John Riordon commenced business in Brantford, Ontario, as a trader in paper. In 1863 he took his brother Charles into partnership when they commenced the making of wrapping paper at Lock 5, on the old Welland Canal, at St. Catharines, Ontario. The mill capacity at that time was 1½ tons per day.

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL

FIRE HOSE **FIRE EXTINGUISHERS**
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.
30 St. Francois Xavier St. - - MONTREAL
REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

Mention the Forestry Magazine for your identification.

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.
Sault Ste. Marie, Canada.

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Magazine for your identification.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.
Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.
We have assisted in the initial financing and distribution to investors of the following securities which will be quoted on request:

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.
Howard Smith Paper Mills, 8% Pfd. and Participating Stock.
Riordon Pulp & Paper Co., Common (10%) Stock.
Mattagami Pulp & Paper Co., 7% Convertible Debentures.
Wayagamack Pulp & Paper Co., First Mortgage 6 Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.

Hills Seedlings and Transplants

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine.
Forest Planters Guide Free.
THE D. HILL NURSERY CO. Evergreen Specialists
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk

The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sts.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA





QUEEN'S UNIVERSITY

KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.

Mention the Forestry Journal for your identification.

In 1867 they built what was at the time regarded as one of the finest paper mills in America, at Levels 16, 17, 18, 19 and 20 of the Old Welland Canal, at Merritton. It had a daily capacity of ten tons of news and wrapping paper.

In the early '70's the Riordans were among the first on this continent to undertake the making of groundwood pulp, straw pulp and rags forming the raw material for newsprint paper prior to that time. In 1885, John Riordan died, and his son, J. G. Riordan, succeeded to his interests. It was at this time that Charles Riordan became the active head of the company. In 1887, Charles Riordon, in conjunction with the late Governor Russell of Massachusetts, brought the sulphite pulp process to America under patents of Dr. Kelner, of Vienna. The company built a sulphite mill of 30 tons capacity at Merritton, which is still in operation.

Turning once more to Lower Canada, it is found that the next paper mill was built at Portneuf, followed by one at Valleyfield, owned by Messrs. W. and T. Miller, who afterwards sold it to the late Alexander Buntin. Mr. Buntin built extensive additions to the original mill, and installed in it the first wood-grinding machine on the North American continent.

In 1859 the firm of Angus Logan & Company was founded in Montreal, and shortly after this the company had in operation a small mill on the Magog River in Sherbrooke. This consisted of two cylinder machines turning out 2½ tons a day. It employed sixty persons. In 1866 they established a mill in the village of Windsor Mills, and shortly afterwards built what is claimed to be the first pulp mill in Canada. This would appear to be correct, the census returns as late as 1871 making no mention of pulp mills.

From this time on the progress of the industry has been steady and constant. The 1881 census showed Canada to have at that time five pulp mills, with a capital investment of $92,000, employing sixty-eight people, and having an annual output valued at $63,000.

? *WET PAPER* ?

And Consequent Loss

None If Your Cars Are Lined With
SAFETY WATERPROOF FIBRE

We Make It And Make It Well

SAMPLES AND PRICES FOR THE ASKING

CANADA PAPER CO. LIMITED

Montreal Toronto Windsor Mills, P.Q.

Mention the Forestry Magazine for your identification.

In 1891, 24 mills were in operation with a capital investment of $2,900,907, employing 1,025 persons, and with an output valued at $1,057,10.

1901 *and To-day.*

In 1901 there were 25 mills with a capital investment of $11,558,560, employing 3,301 people and with an output valued at $4,246,781.

The most recent census, covering the year 1918, a complete digest of which follows, reports the existence of 37 pulp mills, 31 paper mills and 26 combined pulp and paper mills, a total of 94 mills, in operation. The total capital invested in the industry is given as $241,344,704, of which $12,520,765 is invested in paper mills exclusively. $71,708,223 in pulp mills and $157,115,716 in pulp and paper mills combined. By provinces Quebec leads in the amount of capital invested, with $101,456,296; Ontario, $88,576,807; British Columbia, $42,705,988; New Brunswick, $7,852,225; Nova Scotia, $753,388.

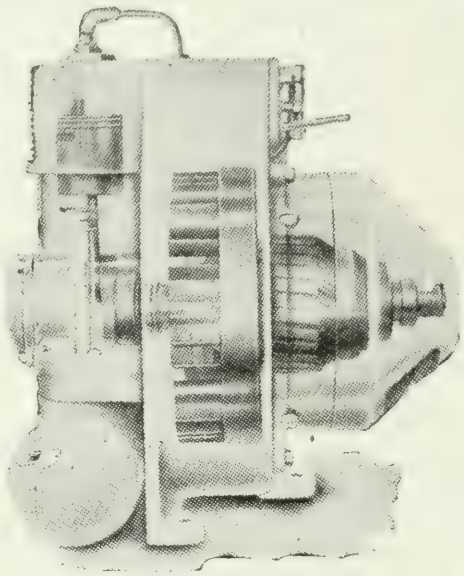
The prairie provinces, Manitoba, Saskatschewan and Alberta, and the Province of Prince Edward Island are not represented in the industry. Tentative proposals have been made from time to time for the erection of one or more pulp and paper mills in Manitoba. An official statement furnished from that province for the purpose of this review says, "There are considerable tracts of pulpwood in different parts of the province, notably in certain sections of northern Manitoba not remote from the new Hudson Bay Railway. Projects for the erection of pulp mills or paper mills have been discussed at one time and another, and it seems more than likely that these will take some definite form in the near future, but as yet they have not ven gone so far as the incorporation of any company for this specific purpose."

From the foregoing, it will be seen that Canada is to-day one of the greatest paper-producing countries in the world. It is probably destined in time to be the greatest. Canadas supermacy in this field rests upon the possession of extensive forest resources and adequate and abundant water-powers. The importance of the latter element may be gauged from the fact that it takes practically 100 h.p. to make a ton of paper and that Canada's water-power development is probably the most economic in the world.

The great development of the industry, which has been a matter of comparatively few years, may be traced to several circumstances, not the least important being enactments by the Governments of the several provinces requiring pulp wood cut from Crown lands to be manufactured within the province; the growth in population and the spread of education which have increased the per capita consumption of paper in every civilized country; the great increase in the number of newspapers and periodicals, particularly on the North American Continent; the proximity of the United States with its rapidly growing population, its gradually diminishing supply of paper-making materials and its consequent increasing reliance upon other countries for its paper supplies, and lastly the improvement in paper-making processes, of which Canadian paper manufacturers have been among the first to take full advantage.

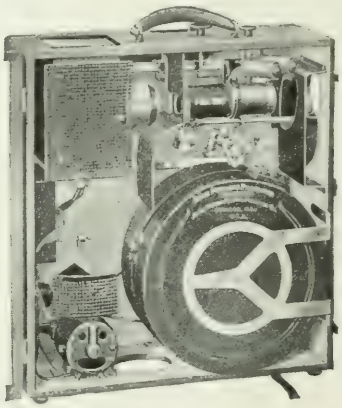
Spruce the Ideal Wood.

Rags were formerly chiefly used for the manufacture of paper, followed by straw, esparto grass, cotton waste and other substances. The Chinese, who are credited with originating the art of paper-making centuries ago, used both vegetable fibre and rags. They also used mulberry and other woods successfully in the production of pulp. Wood pulp is said to have been first used by the papermakers of Europe and America about the year 1860, but it was not until several years later that its use had become commercially successful. Out of the necessity of the time came the development of the chemical processes by which a good and cheap paper was evolved, but in the early attempts it was difficult to find the proper wood. Pine and poplar were tried, but without great success. The world was ransacked for wood better adapted for the purpose. Finally the chemist discovered that spruce and balsam were most suitable for the production of the ideal cheap paper and the difficulty was solved.



The Dynelectric Electric Light Plant

Weighing only 200 lbs., will give 900 watts of electricity. This equipment works with excellent results for motion picture projection.



The Acme Motion Picture Projector

Will project 10 x 12 foot picture. Equipped with fireproof safety magazine. Takes 1,000 foot reels of standard film. MOTOR DRIVEN—FAN COOLED

The above equipment is identical with that used on the tours of Canadian Forestry Association's Cars.

WRITE FOR DESCRIPTIVE CIRCULAR.

PHOTOGRAPHIC STORES

65 Sparks Street

OTTAWA ONT.

Mention the Forestry Journal for your identification.


HELP!
STOP THIS FIRE WASTE
MISS ONTARIO
DISORDER
CARELESSNESS
RUBBISH
SUFFERING
DESTRUCTION
DEATH
RUIN
PREVENTION
FIRE
LEAGUE
ONTARIO
IT IS A PATRIOTIC DUTY TO PREVENT FIRES
ONTARIO
FIRE PREVENTION
LEAGUE INC.
IN AFFILIATION WITH THE
ONTARIO FIRE MARSHAL'S OFFICE
DEPT of PROVINCIAL TREASURER
George F. Lewis, Secy-Treas
TORONTO
CLEAN UP
FIRE PREVENTION WEEK
OCTOBER 9TH
$1,000,000
BURNT MONTHLY IN ONTARIO

RSC
INVESTMENT - SERVICE

Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Donnacona Paper Company.
Fraser Companies, Limited.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Whalen Pulp and Paper Mills.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities Corporation

Limited
MONTREAL

TORONTO, HALIFAX, ST. JOHN, WINNIPEG, NEW YORK, LONDON, ENG.

Mention the Forestry Magazine for your identification.

November
1920

15¢



Illustrated Canadian Forestry Magazine



Bureau of Canadian Information

The Canadian Pacific Railway has established a Bureau of Canadian Information as a branch of its Department of Colonization and Development, with the object of disseminating reliable and up-to-date information as to agricultural and industrial openings in all parts of Canada.

WESTERN CANADA FARM LANDS

The Company has yet for sale several million acres of choice farm lands in Western Canada, at low prices and on long terms of payment. In certain districts lands will be sold without settlement restrictions, but the Company is prepared to grant special concessions to those who will settle upon and develop their farms.

IRRIGATED FARM LANDS

In its irrigation districts in Alberta, the Company has irrigated lands for sale at reasonable prices and on terms extending over twenty years. Under certain conditions, loans for improvements will be granted purchasers of irrigated lands in amounts up to two thousand dollars, to be repaid with land instalments.

EASTERN CANADA FARM LANDS

Lists of selected improved farms, available for settlement in Ontario, Quebec and the Maritime Provinces, with the names and addresses of their owners, may be obtained on application at any office of the Department.

INDUSTRIAL INVESTIGATION AND RESEARCH

Investigations, looking to the utilization of undeveloped natural resources and waste products and new industrial processes, are being carried on by the Research Section of the Department. Inquiries as to promising fields for investigation in this connection are invited.

INDUSTRIAL OPENINGS

Reliable information as to sites for new industries in all parts of Canada, and of special business openings in the growing towns and cities along the lines of the Canadian Pacific Railway in both Eastern and Western Canada, will be gladly furnished on request.

CANADIAN INTELLIGENCE SERVICE

Well equipped Canadian reference libraries have been established by the Department at Montreal, New York, Chicago, and London, England. These libraries contain the fullest information on all matters relating to Canada and her undeveloped resources, and are kept supplied with the latest information pertaining to new developments through the medium of a news service organized through the co-operation of the other departments of the Company's service. The information on hand in these libraries is available without charge to those interested, and inquiries addressed to any office of the Department will receive prompt attention.

DEPARTMENT OF COLONIZATION AND DEVELOPMENT CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.
WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.
CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.
NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.
CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.
LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

E. G. WHITE,
Superintendent,
MONTREAL, Que.

J. S. DENNIS,
Superintendent,
MONTREAL, Que.

VETERAN

motor trucks

Built in Canada

In buying a **Truck** of the **VETERAN** class your purchase price, although naturally more than the price of an inferior truck, saves you money in the long run.

You do not have to pay for your truck over and over again in maintenance and repairs. The **VETERAN** is a **ONE PRICE TRUCK.**

Eastern Canada Motor Truck Co., Limited

HULL, QUE.

Mention the Forestry Magazine for your identification.

Domestic and Foreign Banking Facilities For Your Home and Overseas Trade



THE ROYAL BANK OF CANADA

Total Resources $590,000,000

Join Hands with the Canadian Forestry Association

A COUNTRY-WIDE Educational Union of 11,000 citizens endeavoring to promote the national welfare through (1) the protection and proper management of Canada's forest assets, in order to perpetuate the timber resources for all time, and (2) the development of tree planting on the bare prairies and in our towns and cities.



Membership is open to all. Annual fee $2, including subscription to the Illustrated Canadian Forestry Magazine, a non-technical interesting monthly. If you like trees, you'll enjoy the Forestry Magazine.

Hon. President, SIR R. L. BORDEN Vice-President, DAN. McLACHLIN
President, C. E. E. USSHER Secretary, ROBSON BLACK
Ass't. Secretary, G. GERALD BLYTH

Suite 224, Jackson Building, - - - - - - - - - OTTAWA

Mention the Forestry Magazine for your identification.

British Columbia Forest Products



Display at Office of B.C. Lumber Commissioner, 1 Adelaide Street East, Toronto

For information regarding

BRITISH COLUMBIA

Douglas Fir	Western Soft Pine
Western Hemlock	Western Larch
Western Red Cedar	Sitka Spruce

Apply to

BRITISH COLUMBIA LUMBER COMMISSIONER

1 Adelaide Street East, Toronto,
or Chief Forester, Victoria, B.C.

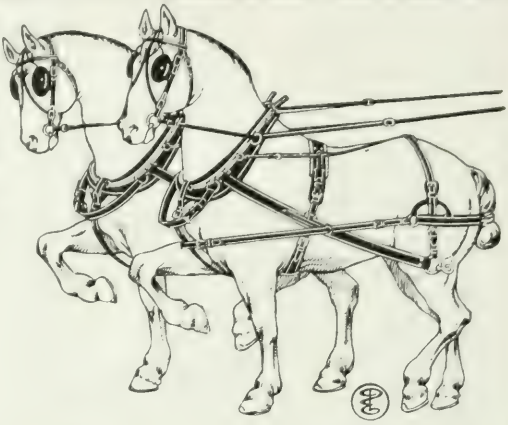
Harness That Stands The Heaviest Strains

People who are particular about the kind of horses they drive should also be particular about the kind of harness they use. Furthermore the best way to get the utmost out of your horses—is to furnish them with the best possible equipment. Our "Carson Quality" Michigan Lumber and Skidding Harness is the best possible equipment that money can buy.

It is made of superior quality oak tanned leather—by skilled Canadian workmen. Built to stand the heaviest strains—it always "delivers" the goods.

We are operating one of the most complete and up-to-date harness factories in Canada—giving unexcelled service in supplying, sorting up orders for all harness parts, hardware, etc. Let us know your wants.

Ask us to send you full information.



Michigan Skidding and Lumber Harness.

Carson Quality

Hugh Carson Co LIMITED

72 ALBERT ST., OTTAWA, CANADA.

We are now manufacturing a special line of pack sacks at particularly low prices. Ask us about them.

Laurentide Company

LIMITED

GRAND MERE, QUEBEC

MANUFACTURERS OF

Groundwood Pulp
Sulphite Pulp
Newsprint Paper
Cardboard

Mention the Forestry Magazine for your identification.

RCULATION: 1,3000 COPIES MONTHLY. ROBSON BLACK, Editor.

Canadian Forestry Magazine

VOL. XVI. PRINTED AT KINGSTON, CANADA, NOVEMBER, 1920. No. 11.

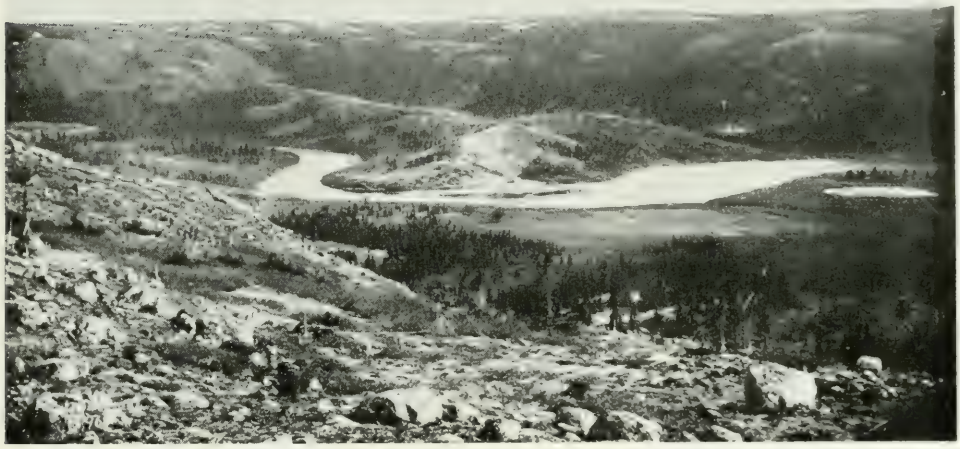


Photo by A. P. Low, Geological Survey.

Labrador: A view giving a good idea of the general topography of the country, but not assuming to advertise the timber resources. Until the disputed boundary line is finally determined as between Labrador and Canada, the security of the timber lands titles is too uncertain to attract the pulp and paper manufacturer.

"What's in Labrador?"



Written for the Canadian Forestry Magazine by Dr. W. T. Grenfell, C.M.G., the Famous Medical Missionary.



Permanent Forestry Industries Certain—Timber and Labor at Hand

Our knowledge of the interior of Labrador and of its timber, pulp, and mineral possibilities is very limited. A few portage routes mostly used by old Hudson Bay Company men, and a few tracks along the main waterways made by Government and other explorers are all that afford us any real information. In 1919, an aerial survey of the region around the bottom of St. Lewis and St. Michaels Bays, from an aerodrome on the delta of the Alexis River, reported several thousand pictures taken from a low altitude, showing everywhere dense spruce and fir forests covering hillsides and valleys. Mr. A. P. Low of the Geologi-

cal Survey, in his report to the Government in 1896, entirely confirms this. He speaks of all Southern Labrador to 54 degrees N. latitude as a subarctic forest belt consisting of nine varieties of trees. It is continuous with the exception of the summits of rocky hills. In latitude 55 he states more than half the country is treeless, but as far north as 58 valleys and lake edges are wooded. Black spruce (*picea nigra*) constitutes, he claims, 90 per cent. of the trees and, next to it, and more hardy than it, is Larix Americana. E. B. Delabarre of Brown University substantiates Low's statements except for saying that the trees near the coast itself are limited to the protected valleys and bay heads. Personally I have visited the bottoms of most of the fyords as far north as Kikkeroaktokak (Finger Bay), just north of Nain, and then west round Cape Chidly into Ungava Bay. At the head of Nain Bay, 40 miles inside or west of Nain, and 60 miles from the outer islands, the forest was very dense on the hillsides and of good spruce. Along the rivers and valleys between Cape Harrison and Hamilton Inlet and north as far as Hopedale there is also quite a lot of forest. I have seen from Big River in Adlavik Bay spars over seventy feet long floated out. But how far into the land the forest runs there, I am unable to say. There is no timber on the coast line north of Hebron, and little inside Cape Mugford till the heads of the bays are reached, or the valley of Georges River. The Valleys of the Grand River and the Norwest River, the Kenaonou, Kenamish, and Mulligan's river in Hamilton Inlet have all a good quantity of timber that would serve for paper pulp many years, and afford some for lumber of good size.

With some University students I made a tour into the country this summer at the bottom of Lewis Bay to look at the timber, where we have at last succeeded in obtaining just 25 square miles on the extreme seaboard and have been instrumental in starting a small mill that is employing 40 families. The land is a series of hills and valleys, the latter filled with lakes and the sheltered hillsides being covered with excellent timber. These self-draining slopes are apparently far the best for the tree growth, although the ability of the ground to hold up tall trees in heavy gales of wind is limited to some extent. On the almost perpendicular sides of the lofty cliffs that flank the extreme northern fyords, I have seen the whole ground covering of the entire hill face that has slipped off, carrying every vestige of vegetation with it in headlong ruin into one hugh mass at the foot of the cliffs.

Some 70 Feet High

The valley of Grand River up to the Falls has been burnt over and the originnal big spruce deteriorated into smaller timber, though in many places fine logs for sawing into lumber abound. There is endless power in these rivers that can be utilized if needed. Round the Falls itself the trees are mostly spruces and according to Eugene Delano and A. P. Low, are 70 feet in height. An experienced lumberman, Mr. Martin, of St. Johns, Newfoundland, who recently made a personal investigation of parts of the coast tells me that nothing but lack of labor, and the inability to obtain sound titles to land grants because the boundary question remains unsettled, prevent profitable pulp and paper industries being opened on the East Labrador Coast. Manufacturing there should be very cheap and though shipping to Europe would probably have to be made between late June and early December, the distance is so short and so safe, that commercial results, as successful as those of Lord Northcliffe's mills in Central Newfoundland, should be quite possible.

Not So Cold in Labrador.

The actual temperatures on Labrador are not nearly as severe as further from the seaboard. The minimum temperature has scarcely ever been known to be as low as 40 degrees F. This was greatly impressed upon me when the very successful mills at Iroquois Falls, Ontario, were being started. A hundred men from Newfoundland and Labrador went to work there. Practically none remained long and all to whom I spoke complained of it being too cold for them. All of my colleagues, both doctors and nurses, who have visited in Labrador have thoroughly enjoyed the winter



Photo by A. P. Low, Geological Survey.

Labrador: The mouth of the Wiachouan River, Richmond Gulf. As the accompanying article by Dr. Grenfell explains clearly, the timber lies in pockets, some representing quite heavy stands, but not near the coast. Recently, Labrador has come into the limelight as a possible source of new pulpwood supplies.

there. One doctor, who came to us from Uganda, put on over 14 pounds weight during the winter.

Problems of the People.

The occupations of our people at present are seasonal. Neither fur nor fish can be considered a constant harvest. The fur is apt to run in cycles, the foxes and their food, the mice, disappearing for a couple of years simultaneously; so that, as is the case this year, we know the hunt will be small and there will be shortage and possible hunger on the coast. Similarly with the Cod; some years they fail to reach into the land, they and the bait fish, called Caplin, being simultaneously missing along certain sections of the Coast. We believe this depends entirely upon the local temperature of the water, whether due directly to the winds or indirectly to ice movements, the difference of one degree we think makes a difference to the bait fish which lure the cod to the shore when they (Caplin) come to spawn. That these wage giving industries should be introduced is therefore of the utmost importance as far as the welfare of the Coast is concerned, and we, who live there, most earnestly hope that the boundary question may soon be settled, that proper grants be issued to encourage operators and that the laws concerning grants be rigidly enforced. At present, one of the great hardships, and one that is very materially affecting the population is the fact that the residents of the Coast may not start even small lumber mills because provisional grants have been made of practically all the available country to companies who do not work the area, but continue to hold the rights in spite of existing laws to the contrary. Most of these holders have done nothing for the country, do not live in the country, and simply have taken up the rights in the hope of selling them for personal gain. Several grants have already been sold and resold, but never yet worked and show no signs of commencing. In these days of ever-increasing industrial unrest this form of profiteering is a constant source of irritation to the laboring people and is unquestionably a factor that makes for unreasoning resentment to all law and order.

What Development Means.

A small concrete example of the development of our timber areas might serve to emphasize the point. This year His Excellency, the Governor of Newfoundland paid us a visit and Dr. Harry L. Paddon, my colleague for eight years, was able to point out the very great probability of there being hunger during the winter as the fur prospect was very small. His Excellency considered the matter of sufficient importance to have a government inspector go all the way north from St. John to examine a boiler left with other machinery on the coast at the bottom of Hamilton Inlet, with a view of having half a million or so of lumber sawn to give work for trappers who might make poor hunts.

The one and only real need of Labrador, as I see it, is some wage earning industry, such as pulp and paper making would afford, and which we are confident it will see in the next few years.

To the Empire, the asset of a people preserving our seafaring genius along that coast, handy, hardy, self reliant and resourceful, with true British loyalty and ideals would be invaluable and whoever helps toward that end is a better patriot than he who says "the North is a cold country; every Englishman should move to the softer places of earth."

Wilfrid Grenfell.

The Labrador Boundary.

The coast of Labrador was annexed to Newfoundland in 1763. Ten years later, owing to difficulties arising out of grants made to a number of persons under the French rule, it was changed to Canadian jurisdiction. In 1809 it was again transferred to Newfoundland and has since been attached to this colony.

The difficulty arises over different interpretations of the words "coast of Labrador." One view is that Newfoundland can claim only the coast between Blanc Sablon and Cape Chidley, with perhaps a half a mile inland, and that the rest of Labrador belongs to Canada. As defined in the letters patent, constituting the office of governor of Newfoundland, the boundary was described as a line drawn between Blanc Sablon and Cape Chidley, which would pass through the ocean in certain sections and leave large areas of the coast to the westward of the line and therefore not under Newfoundland jurisdiction.

Many Newfoundland officials hold to the view that the correct delimitation was made in a sessional paper issued in this colony in 1864. Under the phraseology of this document Newfoundland would be entitled to thousands of square miles of the interior of the Labrador peninsula in addition to the coast.



A plantation of Scotch Pine in Windsor Forest, England, at the age of 20 years.

The Canadian Forestry Association

1915 - 3,000 members
1920 - 11,000 members

Ontario to Establish Demonstration Woodlands

Ontario has taken an important forward step in the encouragement of tree planting on barren areas. Hon. Manning Doherty, Minister of Agriculture, recently instructed the Agricultural Representatives of the Provinces in the various counties to take up with the Township Councils the question of establishing demonstration plots of planted trees along well traveled roads. The educational effect of such an enterprise would be incalculable just as demonstration orchards are the most effective form of 'propaganda' in the encouragement of apple production. A letter from the Minister of Agriculture to the Forestry Association states that "the Department is co-operating with the Department of Lands and Forests by endeavoring to interest local Township Councils in the matter and possibly later on giving general supervision to any woodlots which may be established."

Mr. Doherty's letter to all agricultural representatives was as follows:

Toronto, October 4, 1920.

It is the desire of the Government that the reforestration of waste lands be encouraged as generally and as rapidly as possible. In every Township there are areas of land which are used for absolutely no purpose but which would, with attention, produce a crop of timber in a comparatively few years and fully repay the effort and expenditure devoted to the matter. This Department is co-operating with the Forestry Branch of the Department of Lands and Forests in this matter.

To bring this subject prominently to the attention of the people the Government would like to see a demonstration plot established in each township and to this end desires the co-operation of the Township Councils. If the Township Council will purchase an area suitable for this purpose on a well travelled road and have it properly fenced, the Government will undertake to supply and plant trees to reforest such area and look after it in the early years of growth. Such an area of land should not be less than five acres or more than ten acres.

It is my desire that you should bring this proposition to the attention of the Township Councils in your County. I would suggest that you write a letter to the Reeve of each Township outlining the proposition and that you endeavor to see the Reeve of each township personally and discuss the matter with him or as far as possible attend the meeting of the Township Council at which the proposition is discussed. Please assure the Councils that your services are at their disposal in the selection of land for this purpose, as it will of course be expected that you will give the matter your supervision in any Township in which such demonstration wood lots are established.

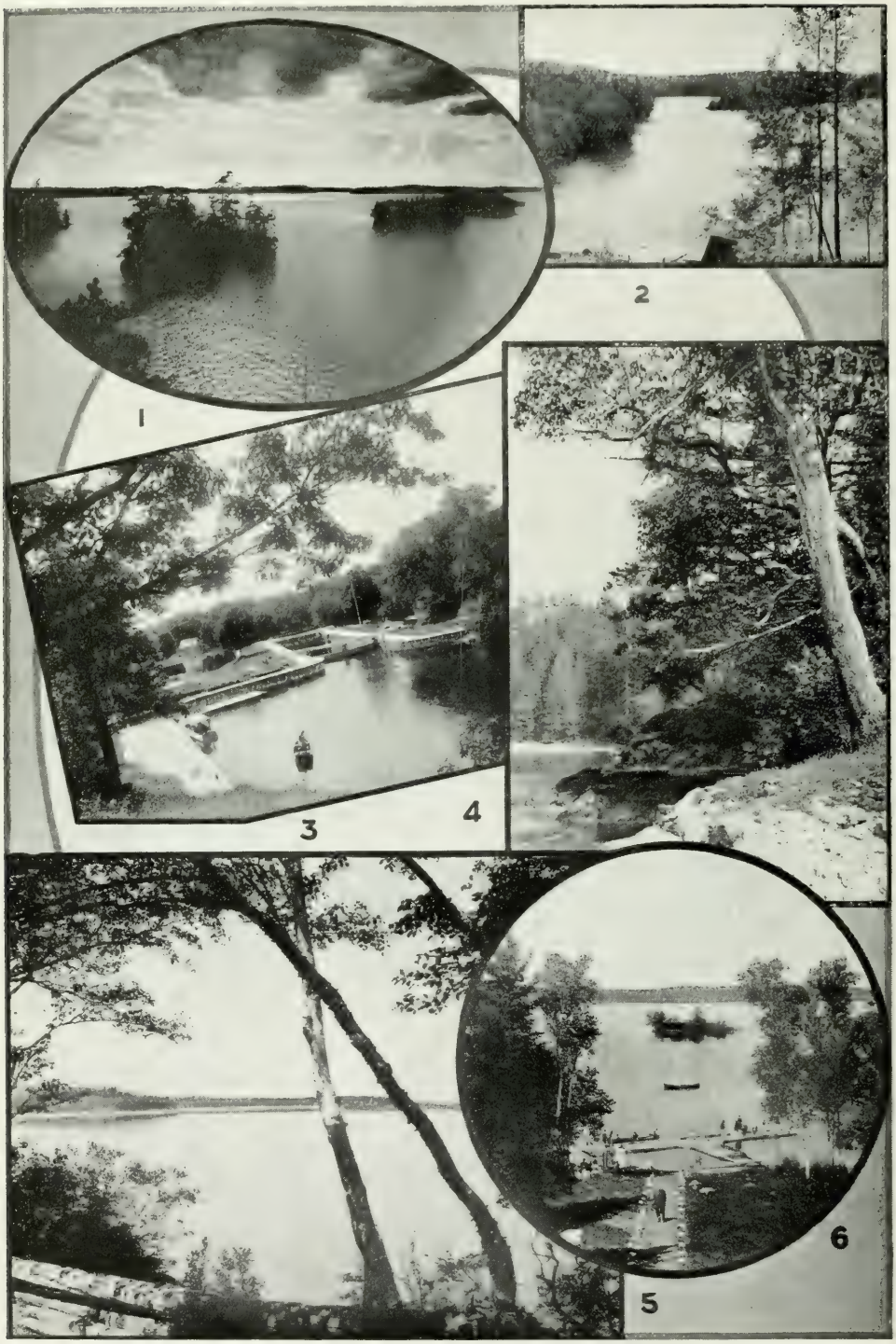
It should be possible to have a large number of these demonstration wood lots started next spring and applications should be received before December 31st. It should be clearly understood that all such demonstration plots will be vested in the Township and any profit which may ultimately accrue will go to the Township. The expense involved on the part of any Township Council is small and I feel that the result in the awakening of a greater interest in this most important problem would inaugurate a movement which would be of great value to the permanent development of this Province.

Trusting the matter will have your prompt and continued interest and attention, I am,

Yours very truly,

Manning W. Doherty,

Minister of Agriculture.



(Courtesy Can. National R'ys.)

OUR LAND OF LAKES AND RIVERS.

1. Venetia Island, Muskoka, Ont. 2. A Quiet Stretch on the Nipigon. 3. A Lock on the Rideau Canal. 4. Near Vancouver, B.C. 5. In the Rideau Lakes. 6. At Minaki Inn; a Winnipeger's Resort.



AMONG THE MOUNTAIN STREAMS

7. C.N.R. Transcontinental Train at Jasper in Alberta. 8. The "Palisades," 9,000 feet in the Famous Maligne District. 9. Mount Robson, B.C., 13,068 feet high, the Monarch of the Canadian Rockies and clearly visible from C.N.R. 10. The Selwyn Range and Moose Lake in B.C. 11. Pyramid Mountain, 9,000 feet high, near the Entrance to the Yellowhead Pass. 12. Mount Warren, 10,500 feet high in Jasper National Park, Alberta.



An afternoon audience of school children at Young, Saskatchewan. This fine body of little folks have just heard Mr. Mitchell's talk on "Tree Planting on the Prairies," together with the motion picture display given inside the Canadian Forestry Association's Tree Planting Car.

Our Travelling Railway Cars

Still going strong and with public interest constantly increasing, the Canadian Forestry Association's Tree Planting Car drew into Carnduff, Sask., recently. Thus reads a few paragraphs of the daily diary:

Afternoon lecture held in two parts: At 2 p.m., 126 children attended; at 3.30 p.m., 70 High School pupils, with 9 teachers and seven other adults came. Car packed for evening lecture, with many turned away. Audience not afraid to ask plenty of questions.

Deloraine, Manitoba: During morning, our Car had a number of visitors. Gave them an impromptu lecture. Afternoon lecture attended by 86 High School pupils, the Principal and 34 other adults. Evening lecture attended by 97 people. An excellent discussion followed. District has suffered from soil drift.

So reads the day to day record of the Association's unique enterprise in the prairie provinces.

Our Eastern Car, called the Forestry Exhibition Car, has been devoting itself to Ontario for some time past and will wind up its Ontario tour at Pembroke and Braeside about November 11th. After that date, if weather permits it will be quickly re-arranged for another Quebec tour of three or four weeks. To it will be attached a special Lecture Car, capable of seating one hundred adults. The Association hopes to send the two cars direct to Three Rivers and use them for educational work in Central Quebec, until snow conditions make further hauling impossible.

The volume of visitors to the Forestry Exhibition Car during its run through Ontario has been unprecedented. Liberal advance advertising was, in part responsible, but the Car, which has lately received many improvements, has attracted crowds at every stop. For example, at Waubaushene, Ontario, such a large number of people came out for the evening motion picture demonstration that it was necessary to open a nearby skating rink where over eight hundred people attended. In many places, the school boards have declared half holidays or have arranged for school essays on forest conservation to supplement the work of the car's exhibits.

Co-operation on the part of all local authorities along the route has been remarkably generous.

How New Brunswick Guards Forests

The development of an efficient fire protective organization has been made possible through the inauguration of the N. B. Forest Act and Forest Fires Act of 1918, the former placing the administration of all matters pertaining to forest fire protection under the Forest Service and the latter Act containing the most modern regulations of carrying out the work of fire protection.

With provision made through these two Acts, a staff of about 1,000 men have been organized to act in case of fire during the dry season and having as a nucleus the permanent staff of Inspectors and Forest Rangers, headed by the Provincial Forester. Each year the staff of temporary men has been increased and the public has become more interested and greater co-operation is possible.

Permanent Staff:

Office Staff.—

Provincial Forester.
Assistant Provincial Forester.
Chief Game Warden.
Chief Scaler.
Stenographers and Clerks. Total 8

Outside Staff.—

Inspectors.	5	
Forest Rangers	37	Total 50

With this permanent nucleus of fifty, an organization of nearly 1,000 men was maintained during the past severe fire season, with full authority to act in case of fire and call out men. These temporary men within telephone call were of immense value during the very hazardous times in May and June of this year, and made it possible for a ranger to deal promptly with all fires in his own district, in spite of the fact that fires occurred in many parts of his district at once.

The temporary force consists of the following:

Voluntary Fire Wardens....	150
Co-operative Fire Wardens..	100
Temporary Game and Fire Wardens	50
Road Supervisors acting as Fire Wardens	500
Caretakers of Settlements....	10
Labor Act Commissioners...	125
Railway Patrolmen	60
Look-out Men.....	4
Total	1,000

The voluntary fire wardens are citizens of settlements in forested sections having authority to call out men to fight fires occuring, and also in many cases to issue fire permits.

The co-operative fire wardens are woods foremen in the employ of lumber companies who received the same authority as Government Fire Wardens.

The Road Supervisors in the employ of the Public Works Department rendered very valuable assistance by acting as fire wardens in case of fire, having been instructed to do so by the Minister of Public Works.

The railway patrolmen on railroads under the Railway Commission and under Provincial Charter were employed and paid by the railroads, while the other railroads entered into a co-operative agreement whereby railway patrol was maintained, the Forest Service assuming the greater part of the cost.

Co-operation Secured.

In addition to the above temporary force, the effectiveness of the Forest Service in controlling forest fires was greatly increased through the co-operation obtained from the various lumber interests, railroads, provincial departments, citizens and professional men. It is interesting to note the increased interest taken by the people of the province and their hearty co-operation is absolutely necessary for the successful extermination of forest fires. Much success has been attained through the use of propaganda, fire posters, warnings to fishermen, campers, the Canadian Forestry Association with its exhibition car and motion pictures, etc.

Area Protected.

The province contains over 12,000,000 acres of forest land, 7,500,000 of which belongs to the Crown. Fires were

fought and extinguished on both Crown and private lands, and it is interesting to note that out of this large area only about 20,000 acres of timber lands were destroyed.

During the past season the department has employed crews of men to extinguish over 150 fires and in addition about three hundred small fires were extinguished by the regular patrolmen and rangers without extra men before they had time to spread, and still other fires were put out by private individuals and lumber companies.

Permanent Improvements.

Two look-out towers are equipped and were used last season with good results, several fires having been located from them.

Tool caches are maintained at various points, and all rangers are supplied with fire fighting equipment. Ranger cabins have been built at many isolated points and stocked with fire fighting tools and emergency rations. The fire protective organization in New Brunswick has developed wonderfully during the last two years and plans are being made for much further improvement in the coming year.

The Pulping of Jack Pine

Some years ago the Wayagamack Pulp & Paper Company Limited, Three Rivers, Que., was equipped with complete apparatus for the purpose of experimental pulping of all the different species of wood.

Experiments have been systematically carried on for a number of years with the object of discovering what different species of wood were suitable for the different qualities of pulp required for the manufacture of all kinds of paepr.

In the provinces of Ontario and Quebec there are enormous tracts of land timbered almost exclusively with what is known as Jack Pine, also called Banksian Pine, or Cypress.

For this reason, it was important to ascertain if Jack Pine could be used for the manufacture of sulfite pulp and ground wood, in spite of all the prejudice against its use for this purpose.

A preliminary examination of Jack Pine, with regard to its resin contents seemed to indicate that the resin was not present in quantities which would prohibit its use for the manufacture of sulfite pulp or ground wood, although Jack Pine seems to have had to carry the blame for all the pitch troubles which all paper mills suffer from, more or less.

If Jack Pine is cooked in a mixture with other wood, trouble is quite likely to result, because Jack Pine apparently requires a stronger acid and a longer cooking time than other species of wood.

If, however, Jack Pine is cooked alone, the company's experiments, as well as those reported below, would indicate that Jack Pine will produce a sulfite pulp which is in all respects equal to Spruce Pulp. The fibre from Jack Pine was found to be about .25 mm. longer than Spruce fibre, which will make it particularly suitable for newsprint.

Some years ago, by special arrangement with Geo. McDougall, of the Jacques-Cartier Pulp & Paper Co., of Pont Rouge, the Wayagamack Pulp & Paper Company Limited, shipped a quantity of Jack Pine to be pulped into ground wood at the Pont Rouge plant.

The pulp obtained from this wood proved to be as good as, if not better than, anything that could be purchased on the market.

The Wayagamack Pulp & Paper Company would like to call the attention of the trade to the fact that from all the experiments made, there is no evidence of excessive pitch which could be traced to the use of Jack Pine.

By arrangement with Messrs. Arthur D. Little Inc., of Cambridge, Mass., sulfite cooking experiments were performed at their laboratory and the Wayagamack Pulp & Paper Company have pleasure in publishing the principal results with the consent of the Arthur D. Little Inc., in the hope that the facts will be of interest to the industry.

It should be carefully noted that the figures obtained from the experiments of Arthur D. Little Inc., seem to demonstrate that the results obtained from the measurements of fibre length and content of pitch for Jack Pine as against Spruce, show that the Jack Pine is *fully equal to Spruce in every respect.*

The following is an extract of the detailed report by Arthur D. Little, Inc.:

"FIBRE LENGTH AND PITCH."

The fibre length of pulp from Jack Pine was rigidly compared with that of Spruce and the results of our measurements are as follows:

	Jack Pine	*Spruce*
Maximum length of fibre	3 mm.	2½ mm.
Minimum length of fibre	1¼ mm.	1¼ mm.
Mean	2.26 mm.	1.92 mm.
Percent of fibre over 2 mm.	80 p.c.	73 p.c.

It will be observed that the fibres in the Jack Pine are superior in length to those of Spruce and should therefore be an excellent substitute for the Spruce, especially in connection with newsprint paper.

As the content of pitch in woods is practically always an indication of their behavior in either the sulfite or ground wood process, we have made an ether alcohol extraction of this Jack Pine to determine the total resins and waxes. These were found to be as follows:

Alcohol extract	2.28 p.c.
x. Ether extract	.30 p.c.
Total Fats, Resins and Waxes	2.58 p.c.

x. Ether extraction made successive to alcohol extraction.

Results of this analysis do not indicate that an excessive amount of resin is present and, furthermore, that this amount of resin does not necessarily preclude the use of Jack Pine in the sulfite process.

It is to be hoped that any person who has made experiments along this line will publish the results of the experiments, for the benefit of all concerned.

F. I. RITCHIE.

Wayagamack Pulp & Paper Co., Ltd.,
Three Rivers, Que.

Mr. Grainger Resigns.

Mr. M. A. Grainger, Chief Forester of British Columbia, has resigned to enter private business. In making the announcement, the Minister of Lands, Hon. Mr. Pattullo highly praised Mr. Grainger's work. "He is a man of exceptional ability and the highest qualifications and his resignation will be keenly felt in the forestry service."

Mr. Grainger, who is an Englishman by birth and a graduate of King's College, Cambridge, having been twenty-first wrangler in mathematics in 1896, came to Canada the next year and participated in the famous gold stampede to the Klondike. There he engaged in hydraulic mining. When the South African war broke out he returned to England and enlisted as a private in Roberts' Horse and served throughout the war. He possesses the South African medal with six bars.

After the war he returned to British Columbia, where he spent some years in the mining and lumbering indusries, finding time to contribute a number of articles to Old Country papers and also to write an interesting book. "Woodsmen of the West," a work which accurately depicted life in the lumber camps and described the vast forest wealth of this Province.

As secretary of the Forestry Commission which investigated the conditions of the industry and the extent of the forest areas of the Province, Mr. Grainger rendered valuable services.

In the legislation which has been drafted relating to the lumber industry Mr. Grainger has taken a leading part; he played a very important part in the organization of the branch which aimed to be one composed of men technically competent.

Hunting Season Cut Off.

The following is indeed a noteworthy despatch. For a hunting season to be arbitrarily cut off by public authority because of the devastation caused by hunter's cigarettes and unextinguished camp fires is perhaps a happy sign that the method of persuasion may be backed up in Canada by a little more of compulsion.

Boston, Oct. 25.—During the hunting season which opened last Wednesday, and which was suspended yesterday by proclamation of Acting Governor Cox, more than 10,000 acres of woodland were burned over, according to a statement today by Commissioner of Conservation W. A. L. Bazeley. Nearly all the forest fires were started by hunters' cigarettes, he said.

With light showers forecast for tonight it was expected the fires still burning would be quenched but the ban on hunting will not be raised until the woodlands are soaked by a heavy rain.

Exhausting the "Inexhaustible."

"Since I have seen your forests and what is left of your forests in many places, I have felt it my duty to do my share in convincing the Americans of the necessity of reforestation. I have heard many people say that there is enough timber left in the south and in the far west to supply the nation for many years. It is not true. When you are in the west they will tell you that the timber is in the south. In the south they will tell you to go to Idaho and Washington. Ten years more cutting the way it is now done by the great lumber concerns and there will be a scarcity of timber in this country. You will have to import lumber.

ALEX. E. F. SCHARD,
Swedish Forester, in an address at
N.Y. College of Forestry.

Toronto Plants Trees.

Toronto's Parks Department has planted 4,487 trees upon the city's streets during the season just ended, a record which has not been exceeded since before the war. They are chiefly Norway maples and American elms, with a few ash.

A despatch from New York indicates that chestnut trees are being discarded there for street use, because they cannot stand the gases from motor cars. "We long ago abandoned the chestnut," said Toronto Parks Commissioner Chambers. "It is a pest-breeder, short-lived, and its foliage litters the streets."

Mr Chambers announced that Lombardy poplars—sometimes called the "exclamation mark" among trees—will be used along the new boulevard to the Humber River, including the Exhibition waterfront.

Paper Suits Sell From $8 Up.

Large quantities of paper suits made in Germany are being displayed by a British firm of importers at its shop in London, according to a despatch received in Washington.

These ready-made suits are cut to English styles and are said to be of the very best class of paper texture, and are being retailed at from $8 to $40 a suit. Last month 40,000 of these suits were imported by a firm of transport agents from Germany via Holland, and another consignment of 5,000 is on the way. Further consignments are expected to arrive at frequent intervals.

A large number of the suits have been re-exported to India and South Africa, says the despatch, but some merchants in London are of the opinion that in view of the present high price of clothing there are wide possibilities in paper suits, especially in industrial districts, if they could be cut more in the English style and to English tastes.

The agents who are dealing in these suits state that by buying under the present rate of exchange it is possible for a man to purchase a new suit once a week, and that over a period of twelve months the entire cost would be less than the price of one single English suit.

In an excellent photograph of spruces and maples at Brandon appearing in the August-September issue of the Forestry Magazine, credit should have been given to Mr. Allan Campbell of Brandon who took the photograph and supplied it to the publication.



"ISLANDS" OF TREES PLANTED AT MAGRATH, ALBERTA.

How to Lay Out a Small Town Park

By Archibald Mitchell, of the Canadian Forestry Association's Staff

During the tour of the Tree Planting Car of the Canadian Forestry Association in the prairie provinces in the summer and fall, Mr. Archibald Mitchell, the Association's representative, prepared numerous plans at the request of municipal authorities and local societies for the establishment of parks and the re-arrangement of school and church grounds. Mr. Mitchell in each instance made a careful personal study of the local situation and then drew up a complete scheme of tree planting on which every reliance may be placed. Our Western readers will note that Mr. Mitchell strongly favors in the case of small parks the artistic grouping of trees so as to form "islands" and deprecates the common practice of planting in straight rows.

The following article, originally prepared for the information of the people of Imperial, Saskatchewan, contains so much of value to other Western towns that it is herewith reproduced in full:

To understand the idea of this Park



THE "ISLAND" PLANTING IDEA IN A SMALL TOWN PARK.

it will be well to bear in mind what a Park is for.

A Park is a place for recreation; a place where we can go for a rest; an entire change from our usual surrounding; a place for "mental sanitation."

Now there are two features of the Prairie which are decidedly monotonous and those are its tree-lessness, and the straight lines on which it is laid out. Straight roads east and west, north and south, straight fences and telephone lines, straight streets and houses in towns, even the horizon is more or less level and what we need in a Park is a place where we can get away from straight lines, and enjoy the beauties of natural curves. Nature very rarely works in straight lines, but she abounds in curves and in our Park we want to get back to nature as much as possible. The desire for a park is only an expression of such a feeling.

No Straight Lines.

Thus, in the Park before us you will see there is very little allowance for straight lines. All the walks are curved and the outlines of the tree islands or groups are all in bold curves. In this way we provide an entire change from the Prairie, for the tree groups will provide a striking contrast to the treelessness.

There are no long lines or avenues of trees. The proper place for them is on your street, not in the Park. Besides, they are expensive to maintain as they have to be kept cultivated or watered, year after year, adding greatly to the taxation of the town.

These islands of trees are in reality miniature forests, arranged in such size, and mixture of varieties as will render them self-maintaining in 3 or 4 years, just as our forests are.

In Parks, as in most other things, it is not the original cost that matters so much as the upkeep, the constant drain afterwards, and this island arrangement is designed to do away with this very thing. Planted properly on well prepared summer fallow they should not require more than three or four years cultivation amounting to some week's work of a man and a single horse and cultivator each year. A very small item.

After the third year, the branches of the trees will be meeting and shading the ground so that cultivation will be no longer necessary. The trees being planted close together will present a solid mass of obstruction to the passing of the winds which will thereby be compelled to go over and not through the plantation, drying it out. In this way the moisture that falls amongst the trees, whether snow or rain, will be retained for the use of the growing plantation.

The trees should be planted four feet by four and seedlings used. The Russian Poplar will be cuttings. The following is a list of the trees required and they should be mixed according to the planting plan and planted in rows to allow for cultivation.

1,000Maples seedlings 12-18 inches.
150 Ash Seedlings 12-18 inches.
150 Elm Seedlings 12-18 inches.
150 Jack Pine (Pinus Banksiana) 12-18 inches.
1,500 Russian Poplar (Populus Petrowskiana) Cuttings.

If you care to use Russian Poplar Plants well and good.

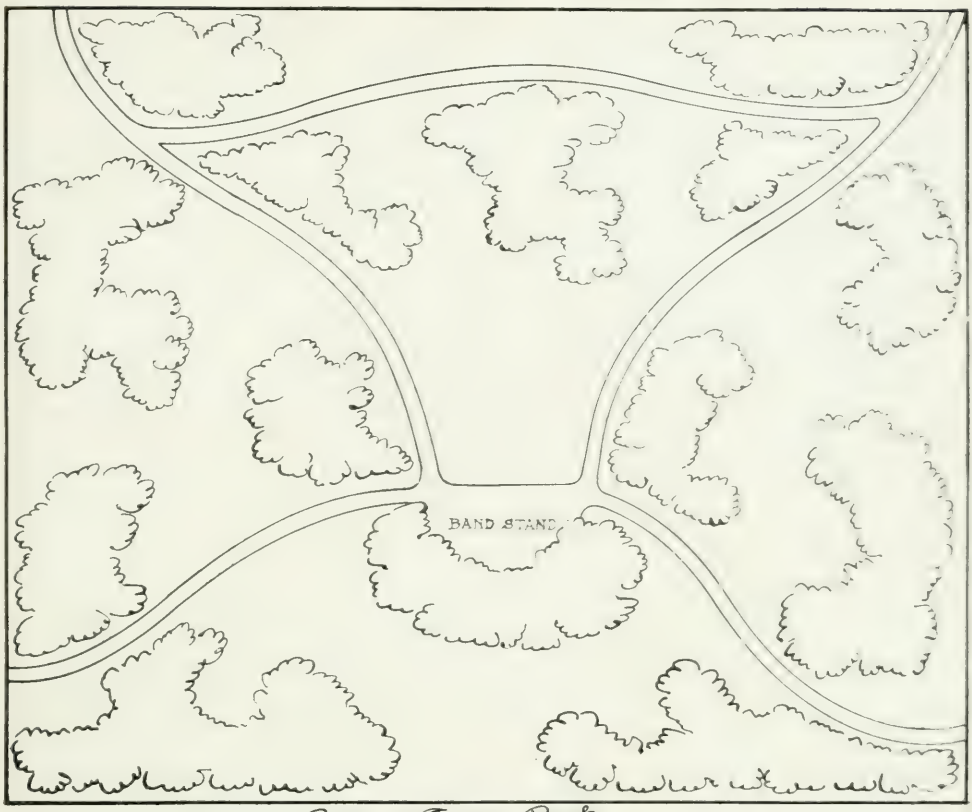
There is no reason why the whole Park should not be planted this coming spring, though there will be more plants to replace in 1922 on the stubble land and those that live will not do so well the first summer, but when you are at it you may as well do it all.

The stubble should be plowed and packed this fall and smoothed ready for the work in spring. Two men should do the whole planting in less than two weeks.

Care must be taken to cultivate the groups as soon as they are planted, and thereafter every two weeks till the end of July, whether weeds appear or not.

Laying out the Ground.

The first thing in laying out the ground will be locating the bandstand. This will be a semi-circle in the middle of the eastern boundary of the level ground. The straight edge bounded by the bottom of the rising ground. The semi-circle is about twenty yards wide from north to south and ten yards in radius



· PLAN OF TOWN PARK ·

towards the west. This open space can be gravelled as the town feels itself able to do it and the bandstand erected. The curve of the trees will protect it from the prevailing winds from the west and make it a snug sheltered place.

The next thing will be marking off the paths as the location of the tree groups will depend on where they are. To do this I would suggest the purchase of a thousand twelve inch flower pot stakes. They are white and easily seen, very cheap and will also be useful for marking off the tree groups.

Marking the Paths.

Each small square on the plan is one yard, so it will not be difficult to locate anything on the ground. There need not be much time taken up with accurate measurements with a tape line. Good enough results can be obtained by careful pacing. Every outline is flexible and may be moved a foot or two, one way or the other, but in general the plan should be adhered to. Particularly is this necessary in the case of the walks, which are in long sweeping curves. They must not be crooked. The bold outlines of the groups should be adhered to, as these add very greatly to the effect. The walks should be six feet wide and a long piece of twine will be necessary to lay them out. Mark the ends and three or four points along the walk, measuring from two sides of the park, stretch the line loosely along these points and then use the pot stakes to get the sweeping curve effect on the balance of the line. The entrance from the outside should always be at right angles to the street for a few feet at least.

After a walk has been laid out it should be marked with a few stout pegs and the pot stakes used for another one. The outline of the walk can easily be picked up again from these permanent stakes and the original curve re-established with the line and small stakes when it comes to be finished.

The borders of the tree groups should not be closer to the walks than three feet and the trees should not be nearer the outline of the group than four feet.

Planting should be done with a spade, directions for which may be found in my bulletin entitled "The Farmers Plantation," on page thirteen. This may be obtained free from the Forestry Office, Indian Head.

How to Make the "Islands."

In marking the groups the northwest one for example, pace along the western boundary for forty nine yards going east, marking each ten yards with a stake. Pace out from each stake the distance as shown in the plan, observing and marking both outside and inside curves. Connect up these stakes by marking the ground with a hoe, making the curves of the outline bold and full. You will not find much difficulty after you get on to it and remember it is always better to have the tree groups too large than too small.

The grass should be sewn on the whole Park this spring, and Kentucky Blue Grass with about a third of White Clover, should be used The grass should be sown in three lots by hand, going N. and S., and E. and W. alternately, finishing with the White Clover. Do a small piece at a time. Each sowing should be raked in when it is made, and the whole thing rolled firm after it is all done.

After the walks are pegged out, the easiest way to make them is to plow along the line of the pegs, using a rolling coulter, if possible, to cut a clear furrow, and throwing the earth into the walk. Three or four inches deep will be quite enough. The grass edge bounding the walk must be sharp and a clean clear furrow is essential. While the clean sharp edge can be restored and improved with the spade, the less of that the better, as it takes time. After the furrows are made, the centre of the walk should be rounded up by using a "V" along the furrow and throwing the loose soil into the middle.

The "V" is made of 8-inch plank. It makes a fine job and saves a lot of work. An ordinary small road drag can be used for the same purpose.

Care of the Park.

The finish of a Park is everything, and no matter how well your trees and grass are growing, they will never have the pleasing appearance they should have unless the edges of the tree groups and the walks are kept trimmed. These should be gone over once a year with a half moon turf iron. It will not take more than a day or two to do, and perhaps need not even be done every year, but it should be borne in mind. Then the grass should be cut. Nothing looks better than a well trimmed lawn and nothing looks worse than a neglected one. Lawn mower cutting is expensive however, and a run over once or twice a year with an ordinary farm mower will do very well. If the town can afford it, perhaps before some big day, a lawn mower can be run along the edges of walks and tree islands, five or six feet wide. This will make a wonderful difference to the appearance of the Park.

Why the "Islands."

This tree island arrangement is the one best suited to small town parks, where you have to make the most of a small piece of ground at as little cost as possible. As we have seen, it costs less to plant and maintain, and besides it makes the Park go further. You see a straight line Park practically all at once, but in this arrangement there is a change of scene every few yards as you proceed along the walks or wander among the grass. New group-effects in the distance spring into view and disclose new stretches of grass curving away behind the trees, each with an invitation to explore still further, so that the whole recreative value of the Park is magnified many fold.

As time goes on and you can afford it, the scenic value can be added to by planting groups of shrubs and flowers on the edges of the tree groups. This will add greatly to the charm of the whole park and it need not be expensive or done right away, and meantime the curving outlines of the walks and tree groups will give you a very fine change from the straight lines so painfully evident both in the country and in town.

The above diagram will give our readers a fairly comprehensive statement of the extent of organized forest guarding in the Dominion. Statistics, of course, do not mirror the whole situation, and no attempt has been made to separate what is spent on personnel and what on constructions as "improvements," as telephone lines, lookout towers, etc. The figures are for 1918 in every case except New Brunswick, which cover 1920.



The party engaged in the aerial forestry reconnaissance at Haileybury, Ontario:—Seated on top, Captain McEwen, pilot; H. McClatchey, mechanic; standing, G. H. Edgecombe, Roland D. Craig and Dr. J. M. Swaine.

An Aerial Survey of the Forests in Northern Ontario

By Roland D. Craig, F.E.

A most interesting experiment in the use of aircraft for forest investigations was recently conducted in Northern Ontario. The Air Board furnished a sea-plane and crew for the joint use of the Commission of Conservation and the Entomological Branch of the Department of Agriculture for the purpose of mapping in the forest areas and also to study the progress of the spruce budworm infestation which is spreading throughout the northern pulpwood forests.

The machine used was a Curtiss flying boat, officially known as the H.C. 2 L. type. It has a wing-spread of 78 feet and is equipped with a 360 h.p. liberty naval type motor. In addition to the pilot, the boat will carry two observers.

As mentioned in the last issue of this magazine, on September 15th, Col. Robt. Leckie, D.S.O., M.C., D.F.C., piloted the machine from Ottawa to Haileybury with Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation and Dr. J. M. Swaine, Forest Entomologist, as passengers. The trip by way of Mattawa and North Bay, covering 336 miles, was made in five hours flying time. Col. Leckie had to return to Ottawa for his trans-Canada flight and left Capt. P. Wickens, A.F.C., as pilot. Later Capt. C. McEwen, M.C., D.F.C., relieved Capt. Wickens. Dr. Swaine and Mr. B. M. Dunn conducted the entomological investigations while G. H. Edgecombe and the writer mapped in the forest types. Haileybury was used as a base until Oct. 7th, when the party moved to North Bay and the forest survey continued in that region.

First Time For Insect Studies.

This is believed to be the first instance in which aircraft have been used in insect studies and the results have proved most satisfactory. In a few hours flying over the region between Kipewa lake and Larder lake, the limits of the budworm infestation and the extent of the damage was determined by noting the discoloration of the affected balsam and spruce trees. This pest has already destroyed millions of dollars worth of balsam and spruce in Quebec and New Brunswick, but it has just made its appearance in Ontario. It is of the utmost importance to the timber owners and the Government to find out quickly the areas affected and the direction in which the infestation is spreading in order that the pulpwood may be utilized before it is rendered useless, which usually occurs



An oblique photograph taken from a seaplane of a section of the north shore of Lake Nipissing, Ontario. The eye can easily detect how the white birch preponderates and where the patches of coniferous trees are located. Experts could easily ascertain from this photograph the approximate stand of merchantable timber on such an area.

within two years after the trees are defoliated. In addition to the aerial observations, a thorough investigation of the infestation is being conducted on the ground in the areas shown to be attacked. Fortunately, the damage in Ontario is as yet comparatively light and is confined to scattered spots between Redwater on the T. & N.O. railway and the height of land and it has not spread very far east of the railway. It is expected that next year the insects will spread from these spots unless prevented by weather or other natural conditions.

What a Flight Discloses.

In connection with the survey of the forest resources of Ontario which is being conducted by the Commission of Conservation the opportunity of studying the forest conditions from the air was of the greatest value. From an altitude of 3,500 feet, it was possible to map in with a reasonable degree of accuracy the main forest types such as recent burns, muskeg, softwood, hardwood and mixed forests. It is possible to distinguish even some of the more conspicuous species of trees and with a very limited amount of ground work in the various types, a comprehensive knowledge of the forest conditions over large areas was secured in a short time. In spite of the fact that on more than half the days adverse weather conditions made aerial observation impossible, the foresters were able to map in the broad forest types on 1,800 sq. miles in the three weeks they were operating around lake Timiskaming. It is estimated that to secure the same information on the ground it would have taken two men upwards of eight months. It is hoped that through the co-operation of the Air Board, a much more extensive aerial survey of the forests of Northern Ontario will be undertaken next summer.

When flying over Timagami lake it was possible to see both lake Nipissing and lake Timiskaming which are ninety miles apart. From this point, several small fires, evidently settlers' clearing

fires, were noted in the vicinity of North Bay over forty miles away and also some north of New Liskeard, at an equal distance. If these fires had been a source of danger, their exact location could have been determined in a few minutes and, if necessary, rangers and fire-fighting equipment could have been landed on the nearest lake in an hour. In this region, where there is such an abundance of lakes, the sea-plane is the most satisfactory type of machine to use, for smooth open landing places for aeroplanes are few and far between in the forest.

The Blight of Fire.

This aerial reconnaissance plainly revealed the widespread damage wrought by forest fires in the Timagami Forest Reserve. When travelling along the lakes and rivers one gets the impression that the area is very largely covered with virgin stand of pine, but from above, the prevalence of the white birch and poplar growth, or bare rocks, shows that immense areas have at one time or another been burned over, leaving a comparatively small percentage of the original forest. There is very little evidence of recent fires, which reflects credit to the fire protection service in that district.

Trees Are Re-establishing.

Except where the fires have been so severe that the thin covering of soil on the rocks has been destroyed, poplar and birch very quickly become established and, except where fires have occurred repeatedly, nature has also established an excellent reproduction of conifers. These young red pine, white pine, jack pine, spruce, balsam and cedar struggle along under the shade of the faster growing broad-leafed trees, but in time they surpass these temporary species and dominate the stand. It would cost millions of dollars to replant the area to the same extent which nature has reforested it, and now only protection from fire is necessary to secure another stand of valuable timber. The development of the softwoods would be greatly stimulated if the poplar and birch were removed, but until a market is developed for this material, this cannot be considered economically feasible and nature's slower method will have to be depended on.

Australia Sets Aside Large Reserves

At a conference held at Melbourne of the Premiers of all the States of Australia, it was decided—

(1.) That an Australian School of Forestry be established in New South Wales, and the cost and maintenance of the school be borne by contribution from each State on a population basis, and a subsidy from the Commonwealth equal to one-sixth of the total contributions from the States.

(2.) That an area of 24,500,000 acres be set aside as a permanent national forest for Australia.

It is happily clear from these resolutions that the leaders of the Governments of Australia recognize the urgency of the forest position, and are prepared to adopt a remedial policy on an adequate scale. The acreage of 24,500,000 referred to is based on data supplied by the forest authorities of the various States, and consists of the whole of the prime timber country of Australia. This area, when compared with the total area of the Commonwealth, 1,903,360,000 acres, works out at only one per cent. But these figures do not convey an adequate conception of the forestry position. It must not be lost sight of that the topographical and climatic conditions of Australia are unique and, if it is recollected that only a very limited portion of the whole of the Commonwealth enjoys a sufficient regular rainfall for the growth of large timber, the area to be reserved assumes an entirely new complexion, and bears a rather more satisfactory relationship to the real resources of the country as regards land suitable for timber growing.



Photo by Clyde Leavitt
How the United Kingdom will restore the forests destroyed during the war. A thriving plantation of Douglas Fir in the Crown Forest of Dean

Forest Research in Canada

By Clyde Leavitt

Chief Forester of the Commission of Conservation

At the Imperial Forestry Conference, held during the past summer at London, England, great stress was laid upon the urgent necessity for a comprehensive scheme of forest research, to serve as a basis for the intelligent handling of the forest with a view to its perpetuation by wise use.. It is generally recognized by those who are familiar with conditions, that lack of intelligent direction in the methods of forest exploitation results usually in the deterioration of the quality and quantity of the succeeding forest, if, indeed, the forest is not entirely destroyed and the land rendered wholly unproductive as a result of the treatment given it.

The effects of repeated forest fires in bringing about forest devastation are now quite generally recognized, and ob-



Boards will make a house, and a little attention to planting will make it a home

ject lessons are plainly to be seen in all parts of the country. There is, however, less recognization of the serious effect upon the composition of the forest brought about by the lack of intelligent regulation of the methods of carrying on cutting operations. For example, white pine, formerly the premier timber tree of Canada, has largely disappeared from great areas where it was formerly plentiful and formed the foundation for the early prosperity of the timber industry of Eastern Canada. The methods of cutting were such as to favor the increasing preponderance of the less valuable species.

The Decline of Spruce.

Similarly, today, spruce, the premier pulpwood species, is being steadily driven out of our eastern forests as a result of heavy cutting for pulpwood and lumber, with but little conscious attempt to so modify the methods of logging as to ensure the continuously satisfactory regeneration of this valuable species on cut-over lands. In very many cases, all the merchantable spruce is taken, but only a percentage of the less valuable and shorter-lived balsam, and generally none of the hardwood species, of which birch is the most conspicuous example. The inevitable effect of such treatment is to increase the proportion of hardwoods and balsam in the succeeding forest, providing the area is fortunate enough to escape the ravages of successive fires.

Authentic information as to the effects of fires and of different methods of cutting upon the composition and growth of the forest is absolutely essential as a foundation for any intelligent system



Group of foresters visiting camp at the forest experiment station maintained at Lake Edward, 15 miles from Grand Mere, P.Q., through co-operation of the Commission of Conservation, Entomological Branch, and Laurentide Company, Ltd. The occasion was the annual conference of the North-Eastern Foresters, held this year in Canada for the first time. Standing, left to right, Dr. C. D. Howe, Acting Dean, Faculty of Forestry at Toronto; W. G. Hastings, State Forester of Vermont; A. E. Moss, Asst. State Forester of Connecticut; R. W. Lyons, Forestry Department of the Laurentide Company; R. D. Craig, Commission of Conservation; L. S. Webb, Asst. Provincial Forester of New Brunswick; Dr. J. M. Swaine, Dominion Entomological Branch. Seated, left to right: Hon. Wm. A. L. Brazeley, Commissioner of Conservation of Massachusetts; C. P. Wilber, State Fire Warden of New Jersey; Austin Cary, U.S. Forest Service; Prof. R. S. Hosmer, Dean, Forestry Dept., Cornell University; W. G. Wright, Dominion Forestry Branch. The North-Eastern Foresters had previously visited the forest nursery and planting operations of the Quebec Forest Service at Berthierville and the similar work of the Laurentide Company at Grand Mere and Proulx. Only a few of them were able to spend the additional time for the further visit to the permanent sample plots and other forest research work at Lake Edward. Photo by G. A. Mulloy, in charge of project.

of forestry practice. One of the resolutions adopted at the Imperial Forestry Conference at London dealing with the situation in Canada, set forth that, important as are researches in the technology of wood, it is of even greater urgency to carry on investigation, on an adequate scale, into such fundamental questions as seeding and regeneration, and rate of growth and outturn of forest crops.

In Canada, only a comparatively small beginning has been made in this direction, due largely to lack of sufficient funds, the scarcity of trained investigators, and an inadequate appreciation of the need for such information, coupled with pressure for the assignment of qualified technical men to administration as distinguished from research.

All this means that a great deal of research must be carried on, if the necessary fundamental nowledge is to be gained. This, in turn, will require the services of many trained investigators, to say nothing of the many well-trained and thoroughly experienced foresters of mature judgment, in both public and private employ who will be necessary to see that the information thus gained is actually made effective on the ground, to the end that the forests may be perpetuated by wise use, instead of destroyed through unregulated exploitation, as has so generally been the case in the United States, apart from the National Forests, to say nothing of great areas of the most accessible of our own non-agricultural lands.

It should be remembered that, so far as Crown lands are concerned, it is the respective Governments having jurisdiction over these lands that are primarily responsible for the absence or existence of adequate restrictive cutting regulations and for their enforcement, if there be such. No general advance along the line of scientific forestry practice on Crown lands is to be anticipated except as prescribed by Governmental authority, notwithstanding that progress in individual cases may take place on the initiative of some of the more progressive concerns. From this viewpoint, it is of the greatest importance that every Governmental agency having to do with the ad-



One of the permanent sample plots on the lands of the Bathurst Lumber Company, New Brunswick. The area in the foreground has been clean-cut and the tops lopped and left lying on the ground. Rapidity of decay under these conditions will be observed, from the viewpoint of ultimate reduction of the fire hazard, and careful observations will be recorded periodically of the extent and character of the natural regeneration which will take place on the area, and the results compared with those on other areas where the slash has been left untouched, and where it has been piled and burned. Similar studies will be made on areas logged to different diameter limits, and all the results will be compared, with a view to determining the best methods of silvi-cultural treatment for these conditions. This project is being carried on, through a co-operative arrangement between the Bathurst Lumber Company, New Brunswick Forest Service and the Commission of Conservation. Photo by W. M. Robertson, in charge of project.

ministration of Crown timber lands should carry on a definite programme of forest research, to the end that the continuity of Governmental forest revenues may be assured, and that the many large and important wood-using industries may be assured of a permanent supply of raw material with consequent benefit to the whole economic structure of the country.

Agencies at Work.

Among the Governmental organizations which have made at least a beginning in forest research are the Dominion Forestry Branch, Quebec Forest Service, New Brunswick Forest Service, Ontario Forestry Branch, British Columbia and the Commission of Conservation. In addition, a number of the pulp and paper companies have done some work along similar lines, either independently or in co-operation with the Commission of Conservation.

The research work of the Commission of Conservation was started as early as 1912, when a survey was made of the Trent Watershed area, Ontario, under the direction of Dr. B. E. Fernow, Dr. C. E. Howe and J. H. White. This study, which was continued in 1913, revealed much valuable data as to the conditions of regeneration on this logged-over area, much of which had suffered seriously from repeated forest fires, with consequent deterioration in the composition of the second growth. The effect of repeated fires in reducing the occurrence of white pine in the regeneration was particularly noticeable.

In 1914, a study was made by Dr. Howe of the reproduction of commercial species in the southern coastal forests of British Columbia. This work was done in co-operation with the British Columbia Forest Branch. One of the conclusions was that light burning of the logging slash and of the dense undergrowth gives the best reproduction of Douglas fir. The need was emphasized for regulated slash-burning and for a more rigid fire protection on the areas already covered with young growth.

Beginning in 1917, the Commission inaugurated, under the immediate direction of Dr. Howe, a programme of investigation to determine what technical measures are necessary to ensure the perpetuation of the vast pulpwood forests of Eastern Canada. In providing for these studies, a somewhat unique development has taken place, under which co-operation has been developed



Another sample plot on the lands of the Bathurst Lumber Company, New Brunswick. Here, the area has been logged practically clean, and slash-burning is under way, after a light snow-fall. The burning of logging slash in piles, after a light fall of snow, is perfectly safe. The object of slash-burning is to reduce the fire hazard. Comparative studies are to be made through a period of years, of the natural regeneration on areas handled under different methods of treatment. Photo by W. M. Robertson, Commission of Conservation.

between the Commission on the one hand, and the Laurentide and Riordon Companies in Quebec, Bathurst Lumber Company and the New Brunswick Forest Service in New Brunswick, and the Abitibi Power and Paper Company and the Spanish River Pulp and Paper Mills in Ontario. These co-operating organizations have borne a share of the cost of collecting data in the field, under the foresters of the Commission.

Getting Down to Brass Tack.

The investigations under way involve a study of the present methods of cutting upon the character of the forest, the amount and kind of natural reproduction, the rate of growth which is taking place, and the effect of forest fires upon the future of the forest. The astonishing development of the Canadian pulp and paper industry during the past few years is of such tremendous importance in the economic and industrial life of the country that too much emphasis can not be placed upon the necessity for ensuring a perpetual supply of the raw material so vitally essential to the continued existence of this great industry. To this end, a vast amount of research will be necessary, challenging the best efforts of all the various agencies, both public and private, which may be in a position to engage in such work.

Sight should not be lost of the fact that the forest resources of Canada amount all together to only about one-third of those of the United States. In the United States, the process of forest devastation has proceeded to a point which is causing the greatest alarm in well-informed circles, both public and private. It is generally admitted, for example, that exploitation of the forests in that country is taking place four times as fast as the forests are growing. One great forest region after another has been largely depleted of its forests, so that the East is to a constantly increasing extent becoming dependent for its forest products upon the west or upon Canada. All this is the direct result, first of lack of protection against forest fires, and, secondly, of the almost complete absence of any regulation of the methods of cutting with a view to leaving cut-over lands in a condition to produce another crop of valuable tree species.

In Canada, while our forests are unquestionably of great extent, they are by no means inexhaustible. Fires have caused untold damage in the past, and still continue to take their toll each year, though the situation in this respect has certainly improved. Nevertheless, in no province can it be said that fire protection is yet on an adequate basis. Forest insect pests and fungus diseases cause annual losses even greater than those due to fires.

What of the Diameter Limit?

So far as the practice of scientific forestry is concerned, conditions are still in a most primitive stage of development. Nearly everywhere, the aim of the operator is the greatest immediate profit, leaving it to Nature to determine the character of the future forest, if any. True, in most of the provinces, diameter limit regulations are prescribed by Governmental authority to govern cutting on Crown lands. It has been shown, however, that diameter limit regulation does not provide at all satisfactorily for the reproduction of the more valuable species in our mixed forests. It is perfectly obvious that the method of treatment must be adapted to the conditions on the ground, and that these conditions will vary materially between different regions, and with the various types of forest and of soil and moisture conditions in each type.



DON'T START SOMETHING YOU CAN'T STOP!

Nearly all forest fires commence with a pair of human hands—the cigarette, the camp fire, the match, the settler and his land-clearing, the railroad locomotive.





HOW TO DRIVE OUT POPULATION.

These illustrations might easily be taken haphazard from a moving picture film photographed in any Canadian province. Eighty per cent. of the habitable portion of Canada is unfit for agriculture, and is fitted by nature to produce only one crop—timber. If we are to accept the estimates of leading authorities, two-thirds of this great tree growing area is to-day producing no material of merchantable value This fact opens up the greatest problem Canadian governments face at the present day.



Rewards for Trained Foresters in Canada

By Dr. C. D. Howe, Dean Faculty of Forestry, University of Toronto

(Fourth Article of series on the Training of a Forester)

The outline of instruction given in the three preceding articles is based on that at the University of Toronto. This forestry school was founded in 1907 and for twelve years was under the enthusiastic and far-seeing guidance of the leader of forestry on this continent, Dr. B. E. Fernow. Several hundred former students and all those believing in the perpetuation of our forest resources by wise use look with very keen regret upon his retirement because of enfeebled health.

The graduate of the school receives the degree of Bachelor of the Science of Forestry (B.Sc.F.). . A six years' course is also given which leads to degrees in both Arts and Forestry. The entrance requirements are those imposed for Junior Matriculation in the Arts courses of the University. It is expected that they will be raised to Senior Matriculation within the next two years.

There are two other forestry schools in Canada, one connected with the University of New Brunswick at Fredericton and the other with Laval University at Quebec City. A forestry school is in the process of making at the University of British Columbia, but as yet no courses have been offered.

New Brunswick's School.

The New Brunswick forestry school began operations in 1908 under the able leadership of Professor R. B. Miller, who last year was succeeded by Professor A. V. S. Pulling. After four years the graduate receives the degree of Bachelor of Science in Forestry. The first two years of the course coincide with the first two years in Civil Engineering and a five years combination course in Engineering and Forestry is given. The school has a 25 acre practice ground adjacent to the University campus and a forest tract of 3,600 acres within easy accessibility, where the practical work of the course is carried on. New Brunswick has thirty-eight graduates in Forestry, nineteen of whom are in government service and ten employed by lumber companies. Six of them are not working along forestry lines. The New Brunswick men are well trained and they are performing an important service in all that pertains to forestry. It is to be regretted that, compared with the others, the New Brunswick Forestry School has such a meagre financial budget on which to work. With proper support in this respect, its good influence could be materially extended.

Laval's Good Work.

The Laval Forestry School was founded in 1910 and for nine years was under the illustrious leadership of Mr. G. C. Piche, the present Provincial Forester, and his associate Mr. Avila Bedard, who is now the Director of the School. These gentlemen always laid particular stress upon the practical side of the students' training and last year by a special act of legislature the School was designated the School of Surveying and Forestry and a still larger portion of the instruction was given to surveying and engineering subjects. At the end of the four year course the successful student is given the degree of Forest Engineer and Bachelor of Science in Surveying. The entrant must pass an examination set by the directorate of the School, unless he already possesses a bachelor's degree in Arts or Science. The Laval Forestry School was founded for the express purpose of furnishing technically trained men for the intelligent management of the forest resources of Quebec, and thirty-three of the fifty-four graduates are employed for that purpose by the Department of Lands and Forests. The progressive attitude of the Quebec government in forestry matters reflects much credit upon its advisers.

145 *Graduates in Forestry.*

Thus it will be seen that the three schools have produced around 145 grad-

uates in Forestry in the dozen or more years of their existence. A little more than one half of these, 79, are in Dominion or provincial government service, and approximately one quarter of them are employed by lumber companies or pulp and paper companies.

The reader who has followed these articles thus far may be interested in a statement as to the opportunities in forestry work. As indicated in the preceding paragraphs, the majority of the forestry school graduates thus far have entered government service. The principal employers are the Dominion Forestry Branch, the Forest Service of Quebec, the British Columbia Forest Branch, the Ontario Forestry Branch, the New Brunswick Forest Service, and the Commission of Conservation at Ottawa.

The work of the Dominion Forestry Branch that administers some 22,500,000 acres of forest land in the four western provinces may be taken as fairly representative of government service. According to the Civil Service regulations the graduate ranks as a forest assistant and he starts in on $1,320 a year, with traveling and living expenses when in the field. He may be called upon to act as an assistant in almost any kind of work, such as estimating timber, making boundary surveys, making maps showing forest conditions, topography and drainage; constructing roads, trails and telephone lines; building bridges, cabins and lookout towers; fighting fires and guarding against trespassers; marking timber for cutting, scaling logs, burning slash and doing reforestation work.

The Salary Reward.

The term as forest assistant is a period of apprenticeship and testing the qualities of the man and lasts two or three years or longer according to individual cases. If the forest assistant makes good, he next steps into the grade of forester, with an initial salary of $1,680, with field expenses paid. His work is practically the same as before, but he is given positions of increasing responsibility and is encouraged to use his head more than his brawn. In fact, he has the opportunity to prepare himself for the higher administrative positions and he may pass next to the grade of superior, when he will have charge of a forest, which may vary from a few hundred to a million acres in extent. A supervisor starts in at $1,800. The superintendent of forest reserves begins on a salary of $2,100 and goes to $2,580. He administers several reserves. The Dominion Forest Reserves are divided into four districts, one in each of the western provinces. The district office administers all the reserves within the province. The District Forester Inspector at Calgary, for example, has charge of more than 12,000,000 acres of forest. This officer begins with a salary of $2,880 and may go to $3,360. At the present time there are only two or three positions in the Forestry Branch that pay salaries higher than this. All the salaries indicated above carry a substantial bonus for men with families and for single men with salaries below $2,100.

The work in provincial forestry branches is similar to that outlined above. Local conditions, however, bring about variations in the emphasis of the work. For example, in one province fire protection may be stressed and in another timber scaling or in still another it may be the examination of timber lands preparatory to leasing. With one or two exceptions the salaries in provincial services are lower than in the Dominion service.

The Demand for Forest Engineers.

There is an increasing demand from lumbermen, especially pulpwood operators, for men trained in engineering and forestry. With cheap stumpage and an overflowing supply, rough and ready rule of thumb methods in the woods and in the mill were adequate, but with the present high prices and with at least an uncertainty as to future supply, much closer utilization is possible and the checking of waste profitable. In many cases, however, the new problems which the new conditions bring are proving too knotty for woodsmen with only empirical knowledge and the managers of the more progressive companies are turning to technically educated men. This trend is particularly noticeable in timber cruising. The limit owners now demand de-

finite data from actual measurements rather than guesses from ocular estimates. About a dozen and a half pulp and paper companies in Eastern Canada employ foresters and for the most part they are engaged in stock-taking to determine the present supply and in growth studies in order to predict the future supply. Their reports are usually accompanied by maps, showing topography and drainage, and plans for closer utilization of materials and the reduction of waste in logging and driving operations. Some twenty or more undergraduates in Forestry at Toronto were working on timber crusing parties during the past summer and as many more could have been placed had they been available.

Reforestation by planting is each year taking a more important place in the forestry plans of pulp and paper companies. Some of them are practically committed to the policy of planting annually a number of trees equal to those cut each year. The forest planting plans of provincial governments in the East are also rapidly expanding. Reforestation work will claim the attention of an increasing number of forestry school graduates in the future.

More Pay in Private Service.

As a whole, the salaries of foresters in private service are higher than those in government service—a condition that does not apply to the forestry profession alone. Naturally, no definite schedule of salaries can be given. Several men in private employment are reported to be earning more than $6,000 and perhaps in one or two cases as high as $10,000 a year.

Forestry students who are intellectually inclined and are attracted by the question marks scattered so abundantly throughout the forest and bristling out of nearly every process in a pulp and paper mill may find abundant opportunities for research work. At the present time the supply of properly trained men for this kind of work is much smaller than the demand.

If a young man gets more enjoyment out of the mere making of money than he does from constructive work he would better not enter the profession of forestry. If he is content with a salaried position that gives certainly as much and probably more opportunity for individual development and constructive accomplishment than any other profession, then he will find satisfaction in forestry.

Paper from Wood Pulp Made in England in 1801

By the kindness of Sir Mayson Beaton, the Canadian Forestry Magazine has been privileged to look over a most interesting and rare book which claims to contain the first sheets of paper made from wood fibre in the British Isles. The book was written by Matthias Koops in 1801 and is entitled: "Historical account of the substances which have been used to describe events and to convey ideas from the earliest date to the invention of Paper."

Mr. Koops, who was a practical paper maker asserts that the book, contains the first paper made from both straw and wood pulp, with no admixture of rags or other vegetable material.

"I am able to produce to the public," says the author, very strong and fine paper made from straw and wood, without any addition of any other known paper stuff, notwithstanding that I have not yet had the advantage of making it in a mill, regularly built for such a new undertaking."

One section of the book appears on an excellent make of wood pulp paper, and the section printed on straw paper is almost equally attractive. Mr. Koops claimed that he had invented a process to restore waste paper to its original condition by the extraction of the ink. As far as the Forestry Magazine is aware, no such process is today in successful operation, although inferior wrapping papers are manuactured from waste newspapers.

Extending Irrigation in Canada West

By H. B. Muckleston



The problem of making three blades of grass grow where none grew before



"I have made the watercourse to be a blessing for the people of Shumir and Accad. I have spread the waters upon the desert. I have made the water to flow in the dry channels and changed the desert into well watered lands. I have given them fertility and plenty. I have made them the abode of happiness." (*From the Tablets of Hammurabi.*)

The document from which the above text is quoted was written something like three thousand years before the beginning of the Christian era by an Assyrian monarch, but it sums up as well for this day as it did then the great things which the further extension of irrigation can do for the prosperity of Western Canada. To the uninitiated the word irrigation unfortunately connotes deserts and famines and other undesirable features, but to those who know what irrigation really means the associations are very different. To them it means intense cultivation, co-operation, peace and plenty, "the abode of happiness."

Irrigation is nothing more than the extension on a large scale of a practice indulged in by every housewife when she waters the carefully tended plants in her



An irrigated field of meadow grass at Brooks, Alberta, 1919

parlor window, or by the proud husband when he uses the garden hose on his lawn, and this form of irrigation is considered necessary even in the most humid parts of Ontario.

All irrigation works may be put into one of two classes, preventive or productive. Where some sort of crop can be grown with reasonable certainty without artificial watering, but much better and more remunerative crops can be secured by its aid, the works are in the productive class. Where agriculture without irrigation is impossible or very precarious the works are preventive. Naturally in any new country the works first undertaken are preventive and it is only after these are well developed that the productive works get under way.

It is generally realized what a large proportion of the cultivatible land on the earth's surface is susceptible of benefit from irrigation. If we consider the arid lands alone where agriculture is otherwise impossible or precarious the proportion is large, but if to these we add those areas where agriculture is improved by irrigation the total is enormous, nearly 70 per cent. of the whole.

There is an old proverb relating to the man who makes two blades of grass grow where one grew before, but what about him who makes three grow where before there were none.

Precarious Conditions.

Agricultural statistics for Western Canada show very plainly that there is a large area in Alberta and Saskatchewan roughly bounded by the mountains, the Red Deer and South Saskatchewan, the 49th parallel and an indefinite line somewhere about the longitude of Moose Jaw, wherein crop production is more or less uncertain and precarious. There is also a border territory north and east of this in which agriculture is not developed to anything like its best by reason of insufficient rainfall. It is an unfortunate fact that to too many people agriculture means grain. Western Canada has been called the "bread basket of the Empire," and perhaps it is, but it should be the butcher shop and the vegetable garden as well. This will never be possible until the waters of the prairies are put to work and the artificial application of water developed to the fullest extent which the conditions allow.

Hitherto the bulk of the development has been under corporate control. A relatively large amount has been carried out privately or by co-operation, but these projects have all been small and scattered. The time has now arrived when large projects must be developed by co-operative organization, and this can only be possible when the co-operation includes every interested agency. Development of a large project involves many operations such as preliminary and reconnaisance surveys, organization, finance, construction and the subsequent management and maintenance. In addition there are certain matters such as the surveys of sources of water supply, the administration of these sources as between projects and provinces and also internationally, the provisions of laws relating to the use and distribution of water, construction of works, organization, governing and financing of the co-operative societies and agencies.

Provincial and Federal Action.

These things come under different authorities. At present, the natural resources, which includes all surface waters, are under federal jurisdiction and the federal government therefore exercises authority in all matters relating to the utilization of water. The Province governs in all matters relating to organization, management and finance. The responsibility for further development is, therefore, a divided one. The Federal Government by its legislation makes itself responsible that water is put to beneficial use and its part therefore is to determine the location and the amount of the available supply and the lands on which it can be best used; and also to insure that the works are sufficient for their service. The remaining steps in development are Provincial matters. It is evident, therefore, that development cannot continue unless each agency does its part. At present the Federal Government has a large and efficient organization at work on its part of the program, and has carried out and is continuing extensive surveys to de-

Forest and Financial Reserves

Forest Reserves are essential to the future welfare of Canada. Financial Reserves are essential to the future welfare of the individual or business organization.

The surest and safest medium for building up your personal reserve is a Savings Deposit Account.

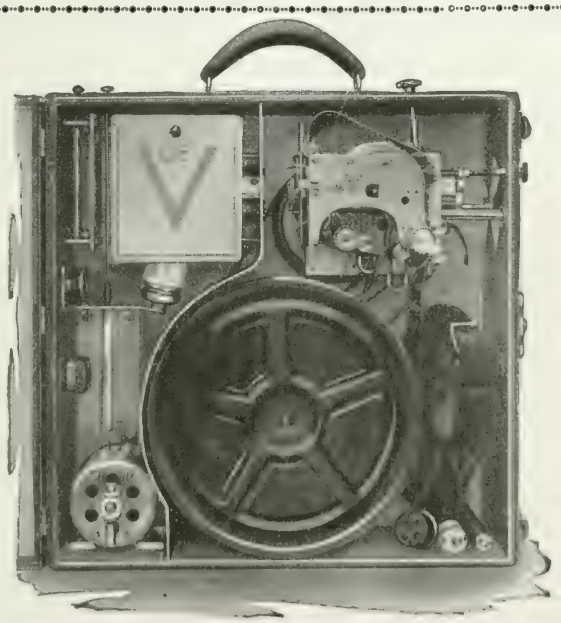
An important feature of every Branch of

THE BANK OF MONTREAL

is its Savings Department, to which all are invited, no matter how small their accounts may be. Every deposit of $1.00 and upwards bears interest at highest current rates.

ESTABLISHED OVER 100 YEARS.

Capital Paid-up	$22,000,000
Reserve	$22,000,000
Total Assets	$571,150,138



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG

Mention the Forestry Magazine for your identification.

termine just what water is available and where that water can best be used. The Provinces have provided the necessary legislation to govern their part of the work and it only remains to make the Federal and Provincial machinery work in harmony and co-operation in order to ensure progress and success.

The Question of Finance.

The main shoal on which the craft may ground is that of finance. Except in very small projects the cost is too great to be paid by assessment and if active development is to continue it must be by borrowed capital. At the present time this class of security is not familiar to Canadian capital and in any event the amount which will be required is so large that outside sources must be sought. The only supply in sight at the present time is in the United States where irrigation bonds in times past have not always been remunerative and where the local legislation and other factors are not well understood. However, if the first developments undertaken were proved sound and the legal machinery workable, subsequent development should be much more easily financed. The Provinces feel that the burden of proof is at least equally divided between the Federal and the Provincial Governments and that some mutual arrangement should be arrived at whereby the earlier steps in co-operative development can be made easy. The settlers unaided can go so far only. They are willing and able to carry the load but require some help in getting it on to their shoulders. Given that help they know the result. They know what irrigation means—a more contented because a more prosperous people. It means better homes and more of them, a better citizenship, better schools, better opportunities for everybody to make good.

THE UNIVERSITY OF TORONTO

AND

UNIVERSITY COLLEGE

WITH WHICH ARE AFFILIATED

ST. MICHAEL'S, TRINITY and VICTORIA COLLEGES

Faculties of

ARTS	MUSIC	MEDICINE
EDUCATION	APPLIED SCIENCE	FORESTRY

Departments of

HOUSEHOLD SCIENCE SOCIAL SERVICE

For information apply to the Registrar of the University, or to the Secretaries of the respective Faculties.

Mention the Forestry Magazine for your identification.

Wireless 'Phones for Fires

Speaking at the Pacific Logging Congress, Mr. M. A. Grainger, Chief Forester of British Columbia gave an account of the use of the Wireless Telephone in forest protection. In May and June of this year installations were made on three shore stations and on five of the launches used by the coast rangers. There have been certain difficulties to overcome. Large wireless stations on the coast cause interference, and in the neighborhood of Vancouver the street car service and other high power lines create an obstacle, but, in spite of these, good results have been secured. As an instance of this, a lumber company in Vancouver heard that a fire had started in its holdings a hundred miles away and was in conversation with the local ranger in half an hour and had his report first thing next morning.

Lumbermen and Pulp Manufacturers Attention !!

WE HAVE UNEXCELLED FACILITIES FOR HANDLING LARGE LINES OF INSURANCE ON LUMBER AND PULPWOOD ALSO PULP AND PAPER MANUFACTURING PLANTS

The E. A. WHITEHEAD CO. LIMITED
INSURANCE BROKERS
509 LEWIS BUILDING
MONTREAL

The Belgo Canadian Pulp and Paper Co., Limited

Shawinigan Falls, Que.

- NEWS PRINT -

Groundwood Pulp
Sulphite Pulp
Lumber

Railways - Canadian National
Canadian Pacific

H. Biermans, Gen. Mgr.

Mention the Forestry Magazine for your identification.

To Pull 'Round Turns in Pathless Woods

Ability to take sharp turns in winding roads makes the Monarch Tractor particularly suited to the requirements of lumbering. The Monarch turns in its own length.

It lays its own track as it goes —broad manganese steel chain traction belts—that gives it firm footing on any surface.

In deep sand, over bogs, on snow and ice, its weight is distributed as though borne on a platform.

And these broad treads grip the ground over an immense surface.

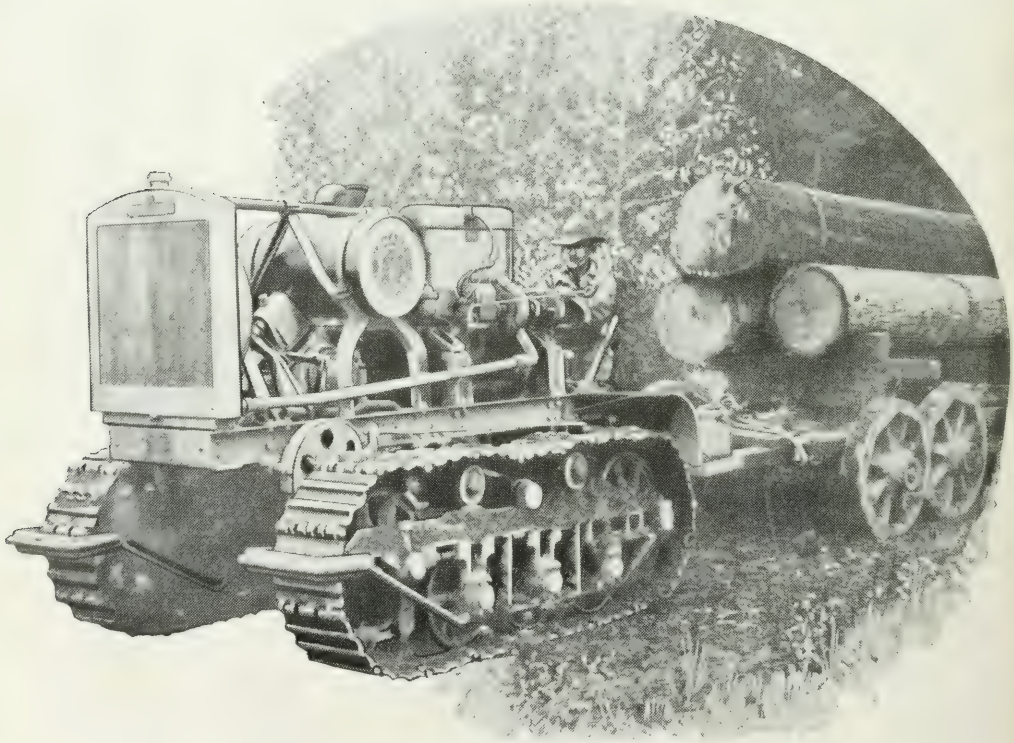
The Monarch is economical to operate, for its fuel is coal oil, but gasoline may be used if desired.

A winch used to replace the regular power belt pulley enables the Monarch to be equipped as a travelling power crane, which in loading and other similar work effects numerous savings in operating costs.

Write for Catalogue to Dept. F.J.I.

Monarch Tractors Ltd.

BRANTFORD, ONTARIO.



Mention the Forestry Magazine for your identification.

Advertising Canada.

The liberal use of motion pictures by the Canadian Forestry Association has been greatly aided by the thorough-going co-operation of the Publicity and Exhibits Branch of the Department of Trade and Commerce at Ottawa. Under direction of the Minister of Trade and Commerce there now exists at Ottawa a complete motion picture manufactory that is doing a very great service not only in inducing foreign investment and immigration but in acquainting Canadians with the resources of their own land. The Publicity and Exhibits Branch in its various departments is doing work equal in all respects to the best products of United States commercial studios.

J

The JOST COMPANY, LTD
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

100 Yards of Ditch in Three Hours

—a better, cleaner and more satisfactory ditch than one dug with pick and shovel, and made in less time and with less labor and less money.

C. X. L. Stumping Powder

dug this ditch—it is digging ditches for hundreds of farmers, who have found the value of C. X. L. on the farm.

Whether you want to drain or irrigate—whether your field is upland or swamp—the C. X. L. way is the most practical.

Use C. X. L. for stumping clearing your waste land and planting your fruit trees—it does the work easier, more economically and it helps to produce better and larger crops.

Our book "Farming with Dynamite" tells you how you can use C. X. L. profitably on your farm. Write for your free copy today.

Canadian Explosives Limited
Transportation Building
Montreal

There is money in Agricultural Blasting. Write for proposition.
16



Mention the Forestry Magazine for your identification.

RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

A Tribute to Our Tree Planting Car

TOWN OF KINDERSLEY
Saskatchewan.
Oct. 8th, 1920.

Robson Black, Esq.,
Canadian Forestry Association,
Jackson Building,
Ottawa.

Dear Sir.—I am directed by my Council to express their appreciation and thanks for the great trouble taken by Mr. Archibald Mitchell in preparing sketch Plan of Park showing how same could be made a beauty spot and a great asset to the town, and I am pleased to inform you that Council purpose carrying out the suggestions made by Mr. Mitchell, and hope to have the work under way early as possible next spring, it being too late to do anything in the matter this year.

Kindly convey to Mr. Mitchell the thanks of my Council for Sketch Plan and suggestions, and assure him they greatly appreciate the interest he has taken in our Park.

I am Dear Sir,
Yours truly,
(Signed) H. R. DYER,
Town Clerk.

"It were difficult to conceive of a better work in the permanent best interests of the people of Saskatchewan than that which is carried on by the Canadian Forestry Association through the medium of its "Tree Planting Car," says J. B. Musselman in the Regina Leader. "Its car is now touring Saskatchewan and it is gratifying to note that all stations visited, farmers in goodly numbers have been in attendance to hear the lectures, to discuss with the experts their local tree planting problems and generally to secure information on the cultivation of trees and shrubbery on the plains."

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks Montreal."

MONTREAL, QUE.



Communication

What is it worth to you?

Prompt—"On the Dot" Communication that keeps your Mill and Woods Department in touch with your office in all weathers.

Uninterrupted communication between your Fire Rangers or Aeroplane Patrols.

MARCONI WIRELESS

Telegraphs
and
Telephones

MANUFACTURED, INSTALLED AND OPERATED BY

The Marconi Wireless Telegraph Company of Canada, Limited

Vancouver
Winnipeg
Toronto

11 St. Sacrament St.
MONTREAL

Halifax
St. John's
Nfl'd

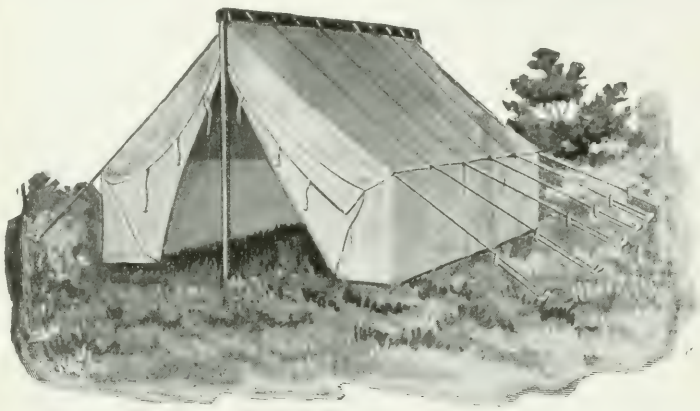
Mention the Forestry Magazine for your identification.

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. Light—Strong—Compact.

Two Colors—White; Green.



WOODS
Manufacturing
Co., Limited.

Canada's Largest
Producers of
Outdoor
Equipment.

OTTAWA
CANADA
Dept. D.

Some Forest Fables

No. 1

By Dr. C. D. Howe

Once upon a time a farmer owned a very large field. It extended over many, many acres. The field was covered with a valuable crop. The soil was of such nature that it would produce only this one particular crop. It was too poor to raise hay, oats, potatoes, wheat or any of the ordinarily cultivated crops. Each season the farmer harvested a portion of his crop and sold it in town.

One dry day in summer he discovered a fire in his field. Instead of calling his neighbors to help him fight the fire, the farmer said to himself: "The field is very large. I will let the fire burn. There will be a-plenty left." So the fire burned until it was quenched by rain. The next season, however, the farmer had to go farther from town to harvest his crop. Being farther away it cost him more to get his crop to the market, so he increased the price of his product, or in other words, the consumer paid for the farmer's neglect in protecting his crop.

The following summer another fire destroyed more of the farmer's field. He soliloquised as before: "The field is very large. It extends over many, many acres. There will be a-plenty left. Let the fire burn," and the fire did burn until the coming of rain. He went still farther from town for his next harvest. It cost him still more to get his product to market, and he raised his price to the consumer.

These things were repeated year after year. The farmer said so often: "I have such a large field. There is a-plenty more," that he actually believed it, and he made his neighbors believe it, but each year he went farther from town to cut his crop and each year the consumer paid the additional cost on transportation. Each year the fires burning and reburning reduced the future crop producing capacity of his field.

This is a real fable. No farmer would stand idly by and see his crop periodically

ATTENTION ! Fire Equipment, Limited, is a manufacturing concern, not jobbers.

We have all kinds of fire fighting appliances for bush fires, such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED
244 Notre Dame Street West : : : Montreal.

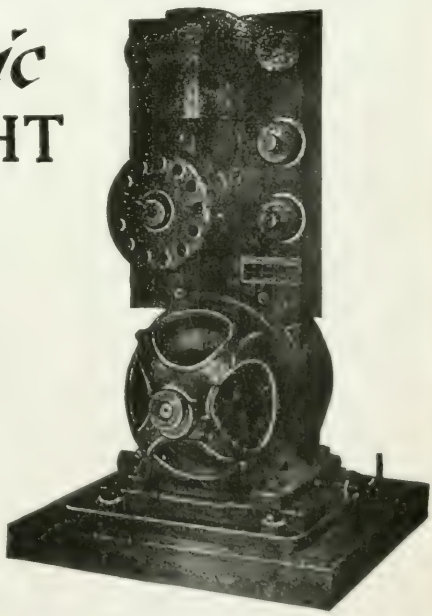
destroyed by fire. The application, however, may well fall upon you and me, the average citizen who owns the crown timber lands. The lumber industry in Ontario began on the shores of the Great Lakes and along the Ottawa River. Because of unrestricted forest fires the industry has been compelled to go farther northward and north-westward. In some places it takes two years to get the logs to the mills, and there is now a scramble for pulpwood concessions in the Hudson Bay region.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

Mention the Forestry Magazine for your identification.

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings — Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber and pulpwood limits.

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." Telephone: Main 3281.

Mention the Forestry Magazine for your identification.

YOU MAY RELY UPON ANY OF THESE FIRMS AND INDIVIDUALS

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador
Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs,
Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

Timber Estimates
JAMES W. SEWALL **Old Town, Maine.**

Mention the Forestry Magazine for your identification.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country
Very Easy Bleaching Sulphite
Spruce, Pine and Hemlock Lumber
Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Mention the Forestry Magazine for your identification.



Irrigation can turn most prairie districts into a Garden of Eden. Here is the product of an irrigattd garden north of Brooks, Alberta.

BROMPTON PULP and PAPER COMPANY, Limited

EAST ANGUS, QUEBEC

MANUFACTURERS OF

NEWS PRINT PAPER

KRAFT PAPER

FIBRE PAPER

MANILLA PAPER

BOX BOARD

SULPHATE PULP

GROUNDWOOD PULP

and

LUMBER OF ALL KINDS

Mention the Forestry Magazine for your identification.



ELECTRIC LIGHT IN THE LUMBER CAMP

Electric Light is convenient.
It cuts out most of the chances for fire, and saves all the bother of oil lights.
There is nothing complicated about the

FAIRBANKS-MORE POWER & LIGHT PLANT
(Made in Canada)

It can be run by anyone and supplies current for 40 20-watt lamps.

The plant is compact, sturdy, portable and efficient; it can be taken anywhere that a wagon or sled can go.

The engine runs nine hours on a gallon of coal oil and develops 1½ horse power. The generating unit weighs but 500 lbs., the batteries 400 lbs.

A belt pulley is provided so the engine can run a pump, the grindstone, the saw gummer or any other light machine for the blacksmith's or repair shop.

Increase the efficiency of your men by adding to their comfort and providing them sharp tools to do their work.

Made in 40, 65, 100 and 200 light sizes.

THE CANADIAN FAIRBANKS-MORSE CO., LTD.,

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.

FAIRBANKS-MORSE QUALITY F M 100%

Mr. Zavitz Takes Charge

According to an official announcement of the Ontario Government, a long-expected change in Ontario's forest administration has taken place by which virtually the full control of all forestry affairs has been transferred to the charge of Mr. E. J. Zavitz, Provincial Forester. Hitherto Mr. Zavitz' jurisdiction covered forest protection and the reforestation enterprises such as the forest tree nursery at St. Williams, Ontario. The Forestry Magazine understands that Mr. Zavitz will now have control of all branches of timber administration which involves a most important departure from the previous policies of Ontario Governments.

Forest Fires in B. C.

Nine hundred and eighty-one forest fires were reported to the chief forester of British Columbia to September 15th this year. The cost of fighting and extinguishing these outbreaks is officially recorded at $182,400. No estimate of the actual amount of timber destroyed is at present available. The figures read as under or the various districts:

	Fires	Expenditure
Vancouver (including Vancouver island)	200	$45,500
Nelson	248	65,000
Cranbrook	98	40,000
Kamloops	75	15,000
Vernon	76	15,000
Prince Rupert	56	458
Cariboo	50	600
Prince George	79	1,850

TREES, SHRUBS and SEEDS
HARDY NORTHERN TREE STOCK
EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL

FIRE HOSE FIRE EXTINGUISHERS
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS
LINEN HOSE FOR FOREST FIRE FIGHTING.
Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.
THE CANADIAN FIRE HOSE COMPANY, LTD.
30 St. Francois Xavier St. - - MONTREAL
REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

Mention the Forestry Magazine for your identification.

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.
Sault Ste. Marie, Canada.

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER

SULPHITE PULP

GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

Mention the Forestry Magazine for your identification.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

✣

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.
Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.

We have assisted in the initial financing and distribution to investors of the **following securities which will be quoted on request:**

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.

Howard Smith Paper Mills, 8% Pfd. and Participating Stock.

Riordon Pulp & Paper Co., Common (10%) Stock.

Mattagami Pulp & Paper Co., 7% Convertible Debentures.

Wayagamack Pulp & Paper Co., First Mortgage 6 Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.

EVERGREEN SEEDLINGS

We are equipped to grow EVERGREEN SEEDLINGS in million lots on contract, for REFORESTTING PROJECTS. All standard varieties grown by experts. We save you money. Write for information.

THE D. HILL NURSERY CO. Evergreen Specialists.
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A.

Try This Stump Puller at Our Risk The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sts.
LaCrescent, Minn.



ASK FOR EDDY'S EVERYWHERE IN CANADA

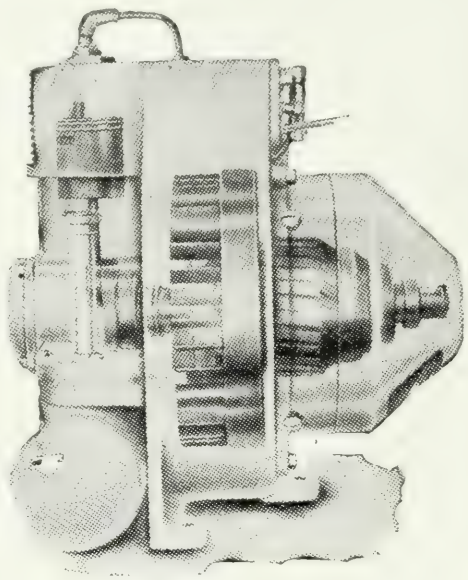




QUEEN'S UNIVERSITY
KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. **NAVIGATION SCHOOL** December to April
26 GEO. Y. CHOWN, Registrar.

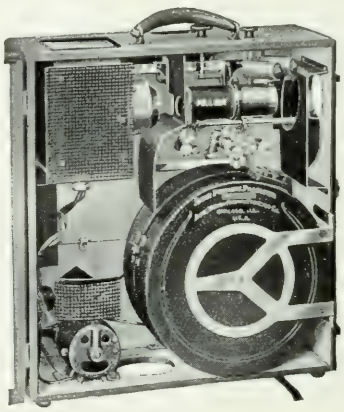
Mention the Forestry Magazine for your identification.



The Dynelectric Electric Light Plant

Weighing only 200 lbs., will give 900 watts of electricity. This equipment works with excellent results for motion picture projection.

The Acme Motion Picture Projector



Will project 10 x 12 foot picture. Equipped with fireproof safety magazine. Takes 1,000 foot reels of standard film. MOTOR DRIVEN—FAN COOLED

The above equipment is identical with that used on the tours of Canadian Forestry Association's Cars.

WRITE FOR DESCRIPTIVE CIRCULAR.

PHOTOGRAPHIC STORES

65 Sparks Street

OTTAWA ONT.

Mention the Forestry Journal for your identification.

Fresh Beef *for* Camps

This is a product your men will want on the table. Feed them with the best. Buy Davies' product. We can also supply you with frozen Beef. All we ask is a trial order. Write, or wire to-day at our expense, and we will gladly submit delivered prices.

Also Try

Long Clear Bacon	Peerless Shortening	Davies Mincemeat	Mess Pork

THE WILLIAM DAVIES COMPANY LIMITED.

MONTREAL. TORONTO. HAMILTON.

How Forest Disease Cuts Our Wood Crop by Half

By James Kay, B.Sc., F.

While a member of a party cruising a tract of virgin timber in Southern British Columbia and Western Montana this summer, I was struck by the large amount of damage done to trees by wood rotting fungi.

Forest fires are spectacular, and combatting them is a source of worry and expense, and the damage and loss is self-evident, whereas the loss caused in the forest by fungi may often escape notice owing to the insidious nature of its attack, the loss may only be evident after felling, or after the trees have been sawn at the mill.

Forest trees are subject to mechanical injuries—snow-break, trees falling and breaking branches and scraping bark off the trunks, bears and deer also damage the stems by tearing and scraping the bark. It is at these injured points that the spores of fungi find lodgement and if ample moisture is present they will germinate and will develop a white fibrous or matted body called the mycelium, which grows and spreads in all directions in the wood. The wood rotting fungi, however, excrete certain ferments which extract the lignin from the cell walls; also in most cases they are able to dissolve completely the basic structure of the cell wall by other ferments.

The number of fungi which affect the lumberman, most closely, are the bracket fungi, and are broadly represented by the perennial form "Fonces" and the annual form "Polyporus." The species Fonces form hard woody shelf-like structures, and as long as the mycelium can obtain food material in its advance into the wood it will develop a new layer of tubes on the under surface each year. Thus, the size of the fruiting body increases yearly.

The species Polyporus produce a fleshy, corky, fruiting body, which rarely functions for more than one year.

How the Fungi Work.

The spores of the bracket fungi are borne on groups of four, each in a tiny spine at the ends of the branches of the mycelium which project from the inner sides of the tubes. When mature these spores are shot from their attachment with just enough force to bring them to the centre of the tube, and they then drop out of the open end at the bottom.

The spores are very light and the slightest breeze carries them long distances. Millions of spores emerge from a single fruiting body a few days after they become mature; they are sticky and adhere to any surface with which they come in contact. A large number find lodgement in wounds where infection is possible.

The germ tube of the spore produces short branches of mycelium which immediately begin the decay of the wood at the point of infection, and soon a large growth of the mycelium occurs, which spreads rapidly.

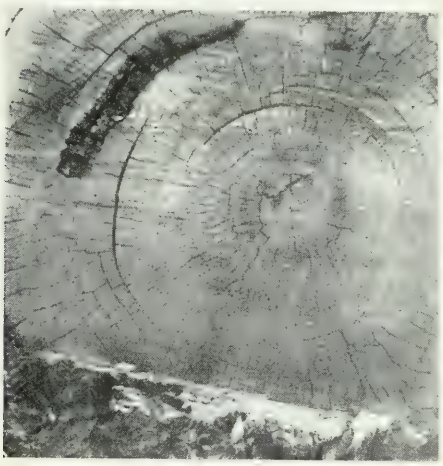


Photo by James Kay.
HOW A LOG TELLS ITS EARLY HISTORY.
This Western Larch is 335 years old, and is 33 inches in diameter. At fifteen years of age it was damaged by fire and again at 150 years. The scars are plainly visible.

Conditions in the forest are ideal for the development of these fungi. Large quantities of windfall and branches are lying around; the logger leaves tops, culls and slash everywhere. These form an ideal nursery ground for the perpetuation and spread of wood destroying fungi.



Photo by James Kay.
How the ever-ready fungus falls upon the weakened tree to complete the work of destruction by inner rot. This Western Larch has been damaged by fire and the Brown Heartwood Rot has quickly formed. Photo taken at Yahk, B.C.

It has been stated that by eliminating the factor of decay in forms of timber now in use, the saving in the annual cut for replacement would amount in the United States and Canada to nearly one hundred million dollars. Stated in another way we would need to produce less than half the timber now used, of the factor of decay were eliminated. "In the forest under the present system of exploitation in this country the losses from wood-rot reduce immensely the yield of timber."

A simple method of disease control in the forest is burning the slash and all diseased trees at the time of cutting.

TIMBER LAND FACTORS

This is our 40th anniversary year

Just another milestone in a long record; but the kind of stability which maintains close business relations with individuals and companies for more than a generation does not happen by mere chance. Only satisfactory service could so long survive. It gives, too, an accumulated wealth of data and experience, which is at your service to-day.

Through these many years, the man who visioned the field and functions of FACTORS in timber lands has remained the inspiration and head of the organization he created. James D. Lacey has built his own success and that of many clients on foresight and confidence in timber. Seldom is it granted an individual to cover so wide a field, and to participate so long and actively in the development of a basic industry.

As Timber Land Factors, we have followed the development and migration of the lumber industry through all regions to its last frontiers, which are largely in Canada to-day. A basis of judgment has been formed as to what to buy and where, which is predicated on long experience in analyzing the complex factors involved. This judgment might be applied to your business advantage in some of your problems or plans.

But our business as FACTORS has called for the development of associated service. Our Timber Cruising and "Lacey Reports" establish a reliable foundation for the purchase or operation of timber properties; in dur Timber Security business, as conducted by The James D. Lacey Timber Company, we underwrite high-class issues, which have passed our own critical inspection.

In a newer field, we now offer Forest Engineering Service in all branches, and are prepared to undertake the Management or Supervision of select operating enterprises.



With well founded confidence in the future greatness of Canada, we are ready to expand an already extensive service in the conservative development of her great forest resources.

If you wish your name put on the list to receive the LACEY TIMBER DIGEST, simply write to the nearest office.

JAMES D. LACEY & CO.

7 East 42 Street,

NEW YORK CITY.

CHICAGO. . . . SEATTLE. . . . PORTLAND, Ore.

RSC
INVESTMENT · SERVICE

Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

Abitibi Power and Paper Company.
Brompton Pulp and Paper Company.
Donnacona Paper Company.
Fraser Companies, Limited.
Mattagami Pulp and Paper Company.
Price Bros. and Company.
Riordon Pulp and Paper Company.
Whalen Pulp and Paper Mills.

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Correspondence Departments are at your disposal.

Royal Securities Corporation

Limited
MONTREAL

TORONTO, HALIFAX, ST. JOHN, WINNIPEG, NEW YORK, LONDON, ENG.

Mention the Forestry Magazine for your identification.

December 1920 15



Illustrated Canadian Forestry Magazine



Bureau of Canadian Information

The Canadian Pacific Railway has established a Bureau of Canadian Information as a branch of its Department of Colonization and Development, with the object of disseminating reliable and up-to-date information as to agricultural and industrial openings in all parts of Canada.

WESTERN CANADA FARM LANDS

The Company has yet for sale several million acres of choice farm lands in Western Canada, at low prices and on long terms of payment. In certain districts lands will be sold without settlement restrictions, but the Company is prepared to grant special concessions to those who will settle upon and develop their farms.

IRRIGATED FARM LANDS

In its irrigation districts in Alberta, the Company has irrigated lands for sale at reasonable prices and on terms extending over twenty years. Under certain conditions, loans for improvements will be granted purchasers of irrigated lands in amounts up to two thousand dollars, to be repaid with land instalments.

EASTERN CANADA FARM LANDS

Lists of selected improved farms, available for settlement in Ontario, Quebec and the Maritime Provinces, with the names and addresses of their owners, may be obtained on application at any office of the Department.

INDUSTRIAL INVESTIGATION AND RESEARCH

Investigations, looking to the utilization of undeveloped natural resources and waste products and new industrial processes, are being carried on by the Research Section of the Department. Inquiries as to promising fields for investigation in this connection are invited.

INDUSTRIAL OPENINGS

Reliable information as to sites for new industries in all parts of Canada, and of special business openings in the growing towns and cities along the lines of the Canadian Pacific Railway in both Eastern and Western Canada, will be gladly furnished on request.

CANADIAN INTELLIGENCE SERVICE

Well equipped Canadian reference libraries have been established by the Department at Montreal, New York, Chicago, and London, England. These libraries contain the fullest information on all matters relating to Canada and her undeveloped resources, and are kept supplied with the latest information pertaining to new developments through the medium of a news service organized through the co-operation of the other departments of the Company's service. The information on hand in these libraries is available without charge to those interested, and inquiries addressed to any office of the Department will receive prompt attention.

DEPARTMENT OF COLONIZATION AND DEVELOPMENT CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.
WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.
CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.
NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.
CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.
LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

E. G. WHITE,
Superintendent,
MONTREAL, Que.

J. S. DENNIS,
Chief Commissioner,
MONTREAL, Que.

VETERAN

motor trucks

Built in Canada

In buying a Truck of the **VETERAN** class your purchase price, although naturally more than the price of an inferior truck, saves you money in the long run.

You do not have to pay for your truck over and over again in maintenance and repairs. The **VETERAN** is a **ONE PRICE TRUCK**.

Eastern Canada Motor Truck Co., Limited

HULL, QUE.

Domestic and Foreign Banking Facilities For Your Home and Overseas Trade



THE ROYAL BANK OF CANADA

Total Resources $590,000,000

Join Hands with the Canadian Forestry Association

A COUNTRY-WIDE Educational Union of 11,000 citizens endeavoring to promote the national welfare through (1) the protection and proper management of Canada's forest assets, in order to perpetuate the timber resources for all time, and (2) the development of tree planting on the bare prairies and in our towns and cities.



Membership is open to all. Annual fee $2, including subscription to the Illustrated Canadian Forestry Magazine, a non-technical interesting monthly. If you like trees, you'll enjoy the Forestry Magazine.

Hon. President, SIR R. L. BORDEN Vice-President, DAN. McLACHLIN
President, C. E. E. USSHER Secretary, ROBSON BLACK
Ass't. Secretary, G. GERALD BLYTH

Suite 224, Jackson Building, - - - - - - - - - OTTAWA

British Columbia Forest Products



Display at Office of B.C. Lumber Commissioner, 1 Adelaide Street East, Toronto

For information regarding

BRITISH COLUMBIA

Douglas Fir	Western Soft Pine
Western Hemlock	Western Larch
Western Red Cedar	Sitka Spruce

Apply to

BRITISH COLUMBIA LUMBER COMMISSIONER

1 Adelaide Street East, Toronto,
or Chief Forester, Victoria, B.C.

Forest and Financial Reserves

Forest Reserves are essential to the future welfare of Canada. Financial Reserves are essential to the future welfare of the individual or business organization.

The surest and safest medium for building up your personal reserve is a Savings Deposit Account.

An important feature of every Branch of

THE BANK OF MONTREAL

is its Savings Department, to which all are invited, no matter how small their accounts may be. Every deposit of $1.00 and upwards bears interest at highest current rates.

ESTABLISHED OVER 100 YEARS.

Capital Paid-up	$22,000,000
Reserve	$22,000,000
Total Assets	$571,150,138

SERVICE and SECURITY

The individual business man,—the business firm,—the corporation, requiring protection in Canada, will find our service one of prompt attention and painstaking endeavour.

WE CORDIALLY INVITE CORRESPONDENCE OR A CALL

HARDY & REYNOLDS
INSURANCE

Specialists in LUMBER and WOODWORKING Plants

BOOTH BUILDING, OTTAWA, ONTARIO.

CIRCULATION: 13,000 COPIES MONTHLY. ROBSON BLACK, Editor.

THE ILLUSTRATED CANADIAN FORESTRY MAGAZINE

VOL. XVI. PRINTED AT KINGSTON, CANADA, DECEMBER, 1920 No. 12

Address all communications to Suite 224, Jackson Building, Ottawa.

Stop the Fires or Lose Our Game!

By Maxwell Graham

Director of Park Animals, Dominion Parks Branch



"If we are to preserve our fur bearers, we must preserve our forests"



"In taking stock of our national resources and considering ways and means for their conservation, it should not be overlooked that an important part of the national assets consist of our insectivorous and game birds, our splendid game animals, and our native fur bearers."

Thus stated Doctor C. Hart Merriam, former Chief of the United States Biological Survey.

If the above is true in regard to the United States, it applies with even greater force to Canada. Because, as a nation a greater percentage of our population follow farming and fruit growing; further, our timber industry is also of greater relative importance than is that of the United States.

It may be assumed that the settled opinion of all well-informed persons is that the game, in its limited sense, both birds and mammals, of a country, has a four-fold value to its people, viz:

(a) The value of birds, game and non-game, to all the people as insect, rodent and weed-seed destroyers, thus assisting our vegetable and other crop producers and preserving our fast diminishing forests.

(b) The value of game quadrupeds certain birds, and fish, as food assets.

(c) The value of all game as an incentive and inducement to an out-door life whereby man may recuperate his powers and renew his health.

(d) The value of game in an economic and financial way to a country because of the tourists and sportsmen's travel attracted thereby.

Many varieties of game animals and game birds, and practically all of our fur-bearers, are products of our forests.

Among big game, Moose and Woodland Caribou are essentially products of our forests.

It is in forested areas, in the more northerly districts, that the densest and finest of our furs are to be found. But the ever expanding area of human settlements have caused many districts, formerly the haunts of fur-bearers, to be now entirely denuded of them. The clearing away of the forests and the grazing of natural coverts by domestic

animals have destroyed their haunts and exposed them to their enemies, and to quote a report from our Commission of Conservation, "Draining swampy areas has destroyed the homes of the muskrat, the mink, the otter and the beaver. The fisher and marten never seem to exist long near man's habitation. Even the fox, which appears to increase near settlements, will decrease if the forests are wholly removed or burned."

How Forests Affect Fur.

As showing the effect of a forest environment on fur, timber or forest wolves have finer fur and of darker colour than those living on exposed prairies.

The herd of buffalo maintained at Elk Island Park, near Lamont, Alberta, though from the same stock as those at Wainwright in the same province, have noticeably become darker in colour since their sojourn in Elk Island Park, this latter being largely a forested area, whereas Buffalo Park is in the prairie district.

If we are to preserve our fur-bearers we must preserve our forests, and in order to safeguard the future of fur-farming it is imperative that more fur-bearers' sanctuaries be established in forested areas before it is too late.

Our Need of Sanctuaries.

In such sanctuaries, fur-bearers, game animals, and wild life generally would, under proper supervision, increase and multiply unmolested, with the increase overflowing the surrounding country to the profit and recreation of all the people. While from time to time permits could be issued to capture alive fur-bearers in such sanctuaries for needful infusion of new blood in fur-farms, the stock in which for lack of such infusion would soon deteriorate.

Generally speaking, only a small percentage of all our forested lands are owned by private individuals. In the East, the forests are under the control of the respective Provinces, while in the Prairie West and part of British Columbia the forested areas are controlled by the Dominion Government. Our national parks, whose value to the country as game sanctuaries cannot be over-estimated, are situated in the West, but a large portion of the East is covered with vast stretches of forest and swamp lands covered with cedar, portions of



In the game sanctuary of Rocky Mountains Park, Alberta.

which might well be set aside as sanctuaries.

Northern Ontario's Loss.

And, in this connection, the prime disaster to the game resources in Northern Ontario and Quebec has not been due to improved firearms or such access of direct destruction as swept away the buffalo and other western game, but was incidental to tremendously destructive forest fires.

It has been estimated that from the north shore of the Gulf of St. Lawrence to the barrens, three-fourths of the country, formerly forested, has been laid waste within historic times. Most of this area having only a thin mat of organic soil, this latter has been entirely destroyed over large areas, leaving only rock and sterile subsoil. Where the soil remains, gradual replacement of the forest goes on, but when cover is destroyed, such low and swampy lands as were spared can support but little game, and afford little protection from the hunters to such as survive.

Many such areas formerly abounding in game, which supported a considerable number of Indians, are now sterile and contain no game. The lesson this teaches is obvious: namely, that the strictest supervision of all forested areas with a view to minimizing fire hazards is imperative if our forests are to be preserved and in them the game that is dependent on the forests.

MAXWELL GRAHAM,
Director of Park Animals.

Will Learn From Sweden

The Canadian Pulp and Paper Association has decided to send Mr. Edward Beck of its executive staff to Sweden early next year to make a study of Swedish forestry methods and report upon them. Mr. Beck, who is a trained newspaper man, will go in the capacity of an observer and not as a forestry propagandist. His reports will be syndicated to a number of leading Canadian newspapers and trade journals.

This constitutes one of the most far-seeing and beneficial enterprises yet undertaken by the Canadian Pulp and Paper Association. Sweden provides the closest analogy to Canadian forest and industrial conditions. The co-operation of the State and the wood-using industries in schemes of forest conservation far exceeds any development along these lines in the Dominion of Canada. Mr. Beck's reports on Swedish forestry will therefore possess not only popular interest for Canadians, but valuable information calculated to assist us in formulating our own forest policies.

Hardwood Bush Sells High

At the sale of the W. H. Woods estate, at Bayfield, Ont., J. E. Baechler, of the Goderich Manufacturing Co., Goderich purchased a property of 123 acres, including ninety acres of hardwood bush, at a price of $28,100. A parcel of 103 acres with the buildings thereon was purchased by Thos. McCurdy, of Stratford, for $5,700.

A Business Leader's View.

Jos. N. Shenstone, First Vice-President and Treasurer of the Massey Harris Co., Limited, Toronto, writes to the Canadian Forestry Association:

"I have received your favor of the 12th inst., advising me that I had been nominated for membership in the Canadian Forestry Association, and I have signed the card and sent it in."

"I feel that the Association has a distinct place in our national life, and ought to be supported."

High Bid for Spruce.

Fifty square miles of timber limits were disposed of by the Government of Ontario to J. T. Horne, Fort William, and a new record set for the price of spruce. Mr. Horne offered $6.10 a cord for spruce and 21 cents a tie for jack pine. A few days before $6.05 was the highest price paid for spruce, and previous to that $3.46 was the largest tender. The limits are situated near Jellicoe on the Canadian National Railways east of the Nipegon Reserve.



Photo by Clyde Leavitt

FORESTRY IN SCOTLAND.

At one time the whole of Scotland was covered with dense forest. When the Romans invaded in the third century they employed 50,000 men in destroying and opening up the forests in order to drive out the inhabitants. Later on, rival clans and sects endeavored to rout out their enemies by laying waste enormous tracts of forest.

During the next ten years the British Government Forestry Commission will plant 75,000 acres, and 25,000 acres additional may be afforested privately. Our photograph shows a stand of Scotch Pine,120 yearsold,atGrantown-on-Spey.



Photo by Clyde Leavitt

SCOTLAND REBUILDS ITS DEPLETED FORESTS.

A Douglas fir plantation, 14 years of age. It is questionable whether even the Pacific slope of Canada can show better results than parts of Scotland in the growing of coniferous trees.

Where do We Stand in Timber?

An interview with Senator William C. Edwards,

Chairman of the Committee of Forests of the Commission of Conservation

Few in Canada have done as much personal exploration of forest areas east of the Rockies, or have put under way so many investigations of the whereabouts and quality of commercial timber stands, as Senator Edwards, President of W. C. Edwards & Co., Ltd., Ottawa, the long-established lumber corporation recently absorbed by the Riordon Company Ltd. Twenty-five years ago, Senator Edwards repeatedly sounded a warning to the Canadian people regarding the persistent over-estimate of Canada's timber resources. At the time, and since, Senator Edwards has been accused of deep pessimism by those who seemingly prefer to hold their heads in a purple cloud of illusion even though their feet carry them to the edge of a precipice. The common cry of "inexhaustible timber resources" received little but protest from Senator Edwards many years before any of the provincial governments had considered making accurate inventories of their timber supplies.

"I am not one," said Senator Edwards to the editor of the Canadian Forestry Magazine, "who knows so little about actual conditions as to predict a timber famine within the immediate future. Forest exhaustion is not at hand in the sense that our mills in Eastern Canada will be obliged to shut down next year or the year after, because of a failing supply of logs. I am quite definite, however, when I prophesy that within fifteen years, Eastern Canada will be drawing the bulk of its sawn lumber from British Columbia and will be paying for it through the nose on account of high freight rates. The consumer, not the lumberman or the limit holder, is the man who will pay the price of forest exhaustion.

"The plain fact of the matter is that the cutting of timber limits has been so much more rapid than any new growth could offset, and over and above the waste of the limit through injudicious cutting forest fires have been permitted to strip thousands of square miles of our most valuable timber.

"In addition to complete fire protection which is the corner stone of any scheme of forest conservation, what would you suggest to counteract the present decline of the country's timber assets?" Senator Edwards was asked.

"I have almost given up considering a remedy," he replied, "as long as the mass of the Canadian people look upon their natural resources as the 'greatest on earth' and the degree of exploitation to date as a mere trifling percentage of what can be undertaken in future—I say, as long as this point of view persists (and it is common to the lumberman as to the man on the street) it seems quite unlikely that any public authority will take remedial steps in the presence of this absurdly cheerful outlook. I have not very much hope, therefore in face of the fictitious convictions of the Canadian citizen that any scheme of conservation will be put under way. To one in my position, who knows by firsthand evidence the true condition of the forest resources east of the Rockies, and who sees the present everincreasing tendency to over-exploit our timber areas, it appears that we must pursue our happy way until disaster is upon us. Then we will have no alternative except to satisfy our daily timber requirements by paying the bill of the British Columbia salesman."

"The only remedy for timber land depletion is to guage the cut by the ability of that particular timber area to sustain production. I mean that we should only cut the mature and diseased timber."

"That means a rise in the cost of logging and better prices for the lumber product?"

"Inevitably. How much better that is than to turn the greater part of our Dominion into a barren useless waste? If one were to consider the distance from coast to coast and the amount of agri

cultural land available now or in the future, one would find that there is no more than a strip of farm land of sixty miles wide from Vancouver to Halifax. The remainder of the Dominion is natural forest land or lies in a state of permanent barrenness. Once the forest resources are killed on this immense domain, no crop can follow and it takes its place as a national liability rather than an asset."

"To operate timber lands, on a principle of sustained yield, the limits must be worked as units of the greatest possible size. If we are to inaugurate the restriction of log cutting to mature and diseased trees, automatically the small limit holder is closed out of business. He cannot make a living under such a system. I believe today, as I have always believed, that we have far too many mills to permit of continuous timber growing. I believe that forest conservation cannot be successfully practised unless the operations can be spread over large areas, allowing scope for methods of forest recuperation."

"Do you favor a plan of state management of timber lands similar to that in forests in Sweden?"

"Sweden did not come to its present policy of public supervision of all timber lands, public or private, until she was cutting timber considerably smaller on the average than what we are cutting in Canada. I find difficulty in developing any enthusiasm for a public forestry programme in view of my experience that the people of Canada are so misled regarding the limitations of their forest resources that any calmly-considered scheme for perpetuation of the country's forests would find the public either apathetic or supremely indignant at being disturbed from a happy dream."

The Old, Old Story of the Pine Tree

White-pine operations in the "Lake States" of America began with a single sawmill in 1832; eastern shipments were being made three or four years later; and the culmination was reached in 1892 with a cut of nearly 9 billion feet. Dreary wastes, dismantled sawmills, deserted towns, and an insignificant pine output of a single billion feet in 1918 are depressing reminders of the day when Lake States lumber supplied the markets of the country from the Rockies to the Atlantic Ocean and from the Canadian boundary literally to the Gulf.

The great development of the southern industry began in the seventies and increased rapidly to what was probably the maximum, about 16 billion feet, in 1909. In its turn, southern pine dominated the markets little if any less completely than white pine; but the South is following the course of other regions,, and the remaining supplies of virgin pine are only about one-fifth of the original stand. Within a single decade southern pine production promises to exceed by little, if any, the needs of the South.



Courtesy of the Air Board.

AERIAL PHOTOGRAPHS OF WOODED COUNTRY NEAR OTTAWA, CAN. NOTE THE CLEARNESS OF DETAIL.



Reforestation on Shifting Sand

By Arthur Herbert Richardson, M.A., M.F.,
Ontario Forestry Branch, Toronto

One of the most useful purposes for which reforestation may be undertaken, is that of preventing shifting sand from becoming a menace to the crop producing sections of the farm. In many parts of Ontario this has been tried out so that such work is now well beyond the stage of experimentation.

Three illustrations of the necessity of such work have come to the notice of the writer during the past month. The first is in Renfrew county where many farms border on the Ottawa river, or on lakes formed by its widening. On one of these farms bordering a lake four miles in width, there is a finger shaped ridge of sand, which, not only is useless as regards agriculture, but which also threatens to make useless the good land nearby. At one time this area was covered with large pine which the owner, thinking only of prompt returns, had clean cut, thereby removing the vegetation which had kept the sand in a staple condition. The only record now of what was once a splendid pinery is a few large stumps standing, as it were, on stilts above the surface of the sand. Good soil lies on either side of the ridge, but that which is on the leeward side is being covered continually with sand. Consequently, in order to repair the loss to this farm, which foolishly was created by the one who stripped the sand portions of its tree growth, one thing only can be done; namely, replant the area with trees, which was the crop it was intended to grow. This is what the farmers in that part of Renfrew are doing, with the result that in a few years such trouble will have ceased for good.

A Barrier of Trees.

In Grenville county a section of a man's farm had been denuded similarly of forest growth, and an area of approximately two acres was in a continual state of flux and slowly but surely was being moved toward the better part of his farm. One whole acre of sand had been moved literally a quarter of a mile from its original position. The owner of this farm was enterprising enough to plant trees on this area and thus retard the work of nature and save the more valuable soil from sand inundation.



A stand of Scotch pine planted in 1908, photographed in 1920. These trees, now averaging 20 feet high, were originally placed on a farm in Grenville County, Ontario, to stop the onward sweep of sand dunes, and have splendidly accomplished their task.

The third illustration is also in Grenville Co. and was set out for the same reason as the foregoing. This plantation is also one of the oldest in the province and shows what may be expected of plantations after being set out for a few years. The accompanying photograph was taken in a section of the stand which was planted with scotch pine. It shows the remarkable growth which this species will make on pure quartz sand. With a little play of the imagination one can easily suppose that this potential forest is much older than it really is. The trees shown were planted in 1908, and consequently are now nearing the completion of their thirteenth growing season after planting. They are approximately five feet apart



Is this a record load? There are 306 logs on the sleigh. The job was done by an A1 crew in the camps of McFadden and Mulloy, near Webbwood, Ontario.

which will give a comparative idea of their size. They average twenty feet in height and three and a half inches d.b.h. (diameter breast high). A few of them are twenty-five feet high, and one noticed in passing measured eight inches at the butt.

In these three examples of reforestation, the owners have not only prevented worse than useless soil from injuring the better parts of the farm, but they have also the beginning of a stand of timber which in their own day will yield them valuable returns.



Forests are the regulators of our water powers. The view shows the Saskatchewan River at Grand Rapid.



A NEW USE FOR THE HUMBLE GOAT.

The Forestry Division of the Laurentide Company utilizes Angora goats in fields where it is desired to clear out all hardwood sprouts before planting the spruce seedlings. The goats perform this task with great thoroughness and meekness of spirit. No other automatic machine has been found to equal the goat for this particular job.



IS JACK PINE DESTINED FOR A NEW ROLE?

Experiments by pulp and paper companies have shown that Jack Pine can be used for paper manufacture quite as well as spruce and balsam. It requires special and separate treatment in the pulping process. The proof of the value of Jack Pine may alter the planting programmes of the pulp and paper companies, for this species is a phenomenally rapid grower. Our illustration shows a plantation of Jack Pine set out in 1918 at Proulx, Quebec, on the Laurentide Company's nurseries. The growth is remarkable.

Quebec's Way of Protecting Forests from Fire

By B. N. O'Hara,

Assistant Superintendent Forest Protection Branch, Quebec

Forest fire protection in the province of Quebec is provided for by:

(a) The Forest Protective Associations.

(b) The Limit-Holders who are not affiliated to the Associations.

(c) The Provincial Government's special organizations in different sections.

(d) The Railway Board.

(e) The Public Utilities Commission.

The whole coming under the supervision of the Provincial Government. The Associations are subsidized by the Government, to whom they make monthly reports of their activities and submit all claims for forest fire fighting. One half of the amount of said claims—if approved—being paid by the Government, the other half being paid by the Associations.

The Limit-Holders who are not affiliated to the Associations, also file all claims for fire fighting on licensed lands, to the Government, who pay one half of the claim, if it is approved, the limit-holder paying the other half.

All Fire-Rangers are chosen and paid by those who employ them, but they are appointed by the Government, who supplies them with a badge, forms of reports to be sent in monthly, cotton and other posters. The Rangers employed by the Associations report to their respective Associations. All other Rangers report directly to the Government.

The fire organization of this Province applies to Government owned lands.

The owners of free-hold lands are expected to protect their holdings at their own expense, though in certain cases, where fire occurs on privately owned lands, if such fire appears to be a menace to the Crown Lands in the vicinity, it is fought by those entrusted with the patrolling and protection of the Government lands of the locality and the expense of same is paid for by the Department of Lands and Forests.

How the Associations Work.

There are four Forest Protective Associations in the Province of Quebec. Each Association having its own Board of Directors. The territory protected by each Association is subdivided into districts under Inspectors who take their orders from the Manager, or Superintendent of the Association and who also allots a certain number of fire-rangers to each district, these rangers coming directly under the instructions of the Inspector. These Associations are:

THE OTTAWA RIVER FOREST PROTECTIVE ASSOCIATION, employing one manager and two hundred and twenty inspectors and fire-rangers to protect 26,614 square miles.

THE ST-MAURICE FOREST PROTECTIVE ASSOCIATION, employing one manager and sixty-eight inspectors and fire-rangers, of which ten are employed on R. R. fire patrol, to protect 13,301 square miles.

THE LAURENTIAN FOREST PROTECTIVE ASSOCIATION, employing one manager and eighty-five inspectors and fire-rangers, to protect a territory of 11,163 square miles.

THE SOUTHERN ST-LAWRENCE PROTECTIVE ASSOCIATION, is divided into the Western and the Eastern sections. The West part contains 2,290 square miles and employs one manager and forty-four fire-rangers. The East part contains about 6,000 square miles and employs one manager and 120 inspectors and fire-rangers.

The unaffiliated Limit-Holders, employ 150 fire rangers.

The Provincial Government employ one Inspector and 20 fire-rangers in the Abitibi District, and in the Lake St-John District, 2 Inspectors and 9 fire rangers. At Rawdon 1 special fire ranger. In the Gaspe Pensula 1 Inspector and on the North Shore 3 Inspectors, whose work

is to see that the rangers employed by the unaffiliated limit holders, do their duty.

The Abitibi service was organized two years ago and has given satisfactory results.

In Lake St. John Region.

The Lake St. John organization was inaugurated on a small scale only this year, but the results have been so satisfactory, that it will be much increased next season, if the necessary grant is obtainable, as there is a vast territory of timber lands beyond the Northern settlements, which should be protected from the fire menace, for unfortunately our forests are by no means inexhaustible though many seem to think they are. This system will probably later on be joined by an organization for the protection of the unsold limits of the North Shore, on the one hand and with the Abittibi organization on the other hand. As however these organizations are canoe ones, it will be an expensive system under existing conditions, but it is hoped that the development of the hydroplane service with which the Department is experimenting in the Lake St. John District, will prove sufficiently efficient to warrant their employment on a much more extended scale, in the near future and at a cost which will bring this patrol within reasonable limits.

The Railway Board, in conjunction with the Forest Protective Associations and the Provincial Government, have 3 speeder patrols along the railways, where they run through Government Lands. Where the lands are under license, the Railway, the Association and the Provincial Government each pay one third of the cost. Where the lands are not under license the Government pays two thirds and the Railways pays one-third of the cost.

The Public Utilities Commission, on the railroads coming under their jurisdiction, work along similar lines to the Railway Board.

Trying Out Aerial Patrol.

The Provincial Government, in connection with the Air Board of Ottawa, have been experimenting this season in the use of hydroplanes in the Lake St. John District, with the object of determining to what extent this method can be used for reporting on our forest through photography and sketching, as also for reporting forest fires and carrying men and equipment to the scene of the fire. Enough, however, has not yet been accomplished to warrant passing a final judgment on this method of Forest protection.

Both the Government and the Forest Protective Associations, use the Fairbanks-Morse portable Forest Pumps under certain circumstances have found them of great service, but there are places where they cannot be brought into action and one must rely on the old means of fighting fire with shovels, grub hoes, picks, buckets, etc.

The Provincial Government, during the present season, purchased a number of small garden pumps, which can be easily carried in a pack with the object of "trying them out" in low running ground, or brush fires, but before they were received, the drought in the Abittibi and Lake St. John Districts was over, so that it will be necessary to wait for another season, to pass judgment on the practical utility of these little appliances.

The telephone is of great use in connection with forest protection and some hundreds of miles of line, have already been constructed by the different Protective Associations and by large limit holders who are not affiliated and this mileage is being continually added to. These telephone lines are in most cases connected with the regular telephone system of the locality and by their means, much valuable time is saved in summoning assistance, when a fire occurs in the interior of the limits.

A Policy of Vigilance.

Some fire lookout stations have already been built and the Department contemplates seeing the whole of the timbered area of the Province, under observation of such stations, linked up by telephone.

A start has been made in plotting the burnt areas, but this will be a work of time. When completed, however, such maps will be of great use to the lumbermen, as well as to the Department, as will be seen, when it is stated that 25 per cent. of this year's cut, will be of burnt



Where the Pelican thrives in a government bird sanctuary. Pelican Island, Florida

timber. It is the policy of the Department to have all burnt over areas logged when possible, with the double object of saving the timber and of reducing to a minimum, the fire menace from such burnt areas.

B. N. O'HARA,
Asst. Supt. Forest Prot. Branch.

A Few Uses of Wood.

Lumber and timber products, planing mill products, sash, doors, blinds, and general millwork, window and door screens and weather strips, wooden packing boxes, cigar boxes, barrels and kegs, turned and carved woods, lasts, wooden furniture, including rattan and willow, show cases, billiard tables and materials, looking glasses and picture frames, sewing machine cases, baskets and rattan and willow ware, coffins and burial cases, rules, matches, pulp woods, wood carpet, charcoal, treated and preserved woods, carriages and wagons, aeroplanes, agricultural implements, dairymen's, poulterers' and apiarists' supplies, wood for engraving, musical instruments and materials, paper and wood pulp, phonographs and graphophones, tobacco piles, refrigerators and kitchen cabinets, ships and boards, toys and games, turpentine and rosin, washing machines and clothes wringers, wood distillates, artificial limbs, professional and scientific instruments, handles, clocks, playground equipment, printing material, trunks, shuttles, spools and bobbins, firearms, pulleys and conveyors, patterns and flasks, pumps and wood pipe, tanks and silos, bungs and faucets, brooms and carpet-sweepers, paving materials, pulpers' woodwork.

That list will give some idea of the importance of the campaign for a national forest policy.—Chas. Lathrop Pack.

A County to Replant.

York County, Ontario, is preparing to go into reforestation on a large scale. The committee in charge of reforestation plans, headed by Reeve Geo. B. Podget, of Markham, waited on the Government, and succeeded in getting a promise of assistance. The county will have to buy the land, but the Government has promised to plant it and look after the trees for forty years, when it will turn it back to the county



A GREAT BEECH TREE

MARY PRESCOTT PARSONS

(The Outlook, October 27, 1920.)

It spreads a circle of cool shade around,
And spatters bits of sunlight on the grass.
Some people, walking softly as they pass,
Will hear, high up among its leaves, the sound
Of little, summer winds:—and some have found
It is a tree to look through at the stars—
And thought how light its fretted patterns are
Against the moon, above a snowy ground.

In times of special wonder, when soft snow
Bends down its branches, or ice storms make bright
Each glistening branch and twig, or in the glow
Of sudden lightning-flashes in the night,
Almost it seems a poet among trees,
Interpreting these ancient mysteries.

The Poplar Trees of Canada

(By B. R. Morton, B. Sc. F. Ottawa)

Some twenty-five or more species of poplar (Populus) are known and these are widely distributed throughout the northern portion of both the Eastern and Western Hemispheres. Seven or eight species are native to Canada, some of which are known as aspens and cottonwoods.

The native species include the Aspen (P. tremuloides) also called trembling aspen and white poplar; the Large-Toothed Aspen (P. grandidentata); the Balsam poplar, (P. balsamifera) sometimes called black poplar, balm poplar and tacamahac and balm of Gilead; the Cottonwood (P. deltoides) or Eastern Cottonwood; the Black Cottonwood (P. trichocarpa), or balm cottonwood; the Lanceleaf Cottonwood (P. acuminata); the Narrow leafCottonwood (P. angustifolia) and the Balm of Gilead (P. candicans) which by some authorities is considered a variety of the Balsam poplar rather than a distinct species.

The Aspen (P. tremuloides) has perhaps the widest distribution of any of our native poplars. It extends completely across Canada from Labrador and the south end of Hudson Bay to the north of the Mackenzie river and Alaska. It is found on a large variety of soils but makes its best growth on well-drained loam. It occurs most frequently in pure stands or mixed with the balsam poplar bluffs of the open prairie of the West.

A Short lived Tree.

The Aspen is not a large tree, averaging about 40 feet in height and 8 to 10 inches in diameter. The growth is rapid but not persistent. The tree is not long lived since it is much subject to certain fungus diseases causing early decay. The tree is sometimes used in prairie towns and cities for shade tree purposes but is not as satisfactory for this purpose as some of the other poplars as it rarely develops into a well shaped tree.

The aspen is a prolific seeder and its downy seed is carried long distances by the wind. For this reason it is often the first tree to restock a burned area in the northern woods.

It can be readily distinguished from the other native poplars by the shape of its leaves which are almost circular in outline and from one and a half to two and a half inches long. The margin is finely toothed, whereas the Large-Toothed Aspen, as the name indicates, has its leaf margin very coarsely notched. The leaf stem of the aspen is very much flattened in cross-section and therefore lacking stiffness. The slightest movement of the air sets its leaves in motion. It derives one of its names, trembling aspen, from this fact.

The Balsam Poplar.

The Balsam poplar (P. balsamifera) has practically the same range in Canada as the Aspen and is frequently found in mixed stands with that species. It attains a greater size than does the aspen being a medium sized tree with a height of 50 to 60 feet and a diameter of 1 to 2 feet. Contrary to what might be expected, the balsam poplar does not reach its best development as a forest tree in the more temperate parts of its range. Its best development occurs in the northern part of the prairie provinces, particularly in the Peace River country of Alberta. This is perhaps due to the fact that in that region it is occupying better soils with less competition from other species than it could further east and south.

The oval or egg-shaped leaves which are from 3 to 5 inches long readily distinguish the balsam poplar from either the aspen or Large-toothed Aspen. The leaf stem is round on cross-section or only the lower half is flattened. The winter buds are large and coated with a sticky, fragrant gum.

The Large-toothed aspen (P. grandidentata) is confined largely to Eastern Canada, being found scattered from Nova Scotia and New Brunswick throughout Quebec and Ontario south of the height of land, dividing the waters of the Great Lakes and Hudson Bay extending into southeastern Manitoba.

It is a medium sized tree from 40 to 50 feet in height and 1 to 2 feet in diameter and occupies very much the same soils as the aspen but appears to prefer moist, sandy slopes on borders of streams. It is sometimes found in small, pure stands, but is often mixed with balsam poplar, aspen and birch. It is sometimes used as firewood but seldom cut for saw timber.

As pointed out above, this tree can readily be distinguished from the other poplars within its range by its leaves. The winter buds too readily distinguish it from either the aspen or the balsam poplar. They are not so pointed and narrow as those of the aspen and not so large or sticky as those of the balsam poplar. The buds are dull with the margin of the scales grey and somewhat downy.

The Common Cottonwood.

The Common Cottonwood (P. deltoides) is found in Eastern Canada from Quebec westward throughout southern Ontario. In Western Canada is found throughout the southern part of the three Prairie Provinces. It is mostly confined to the banks of streams and bottom lands of rivers since it is a tree that requires considerable moisture. The tree is a rapid grower and fairly hardy, and is, therefore, used extensively for planting on the prairies. Its rapid growth has also caused it to be planted to a considerable extent for ornamental or shade purposes in Eastern Canada. It has many objectionable features which rapidity of growth does not offset and which make it undesirable for a street tree where better trees can be grown. In a short time it becomes too large for the average street. It soon reaches maturity and begins to decay. Many roots are sent out near the surface and this as they thicken will often raise and crack concrete sidewalks. The pistillate or female trees produce large quantities of white cottony material which is blown about by the wind and sticks to ones clothing as well as filling up the meshes of door and window-screens. However, if care is taken to plant only the staminate or male tree this latter objection is done away with. The cottonwood is one of the largest of the poplars, averaging 75 to 100 feet in height and 2 to 4 feet in diameter. It is readily distinguished from our other native poplars by its leaves. These are triangular in outline and coarsely toothed. The base of the leaves is square and their tip long and pointed.

The Black Cottonwood (P. trichocarpa) is found along the coast of British Columbia and is, for the most part, confined to the moist river bottoms. The trees are large, from 80 to 125 feet in height and 3 to 4 feet in diameter. The leaves are very much like those of the balsam poplar in shape but more leathery in texture. The stems are round in cross-section. The wood of this species, when cut, is chiefly used for boxes and cooperage.

The Lance-leaf Cottonwood (P. acuminata) in Canada is confined to the banks of streams in southern Alberta. It is not abundant and of no commercial value. It is a small tree from 35 to 40 feet high and 1 to 1 1-2 feet in diameter. Its habits and distribution are very much like the narrow leaf cottonwood for which it is often mistaken. The winter buds are longer; more curved, more resinous and the points more drawn out than those of the narrow leaf cottonwood. The leaves are 2 to 4 inches long and ¾ to 2 inches wide and more coarsely notched than those of the narrow leaf.

The Narrow-leaf Cottonwood (P. augustifolia) as pointed out above, has much the same characteristics and range as the lance leaf cottonwood. The leaf is one of its best distinguishing features. It resembles more the leaf of a broadleaf willow than those of the poplar. The leaf stem is also shorter than that of the lance leaf cottonwood.

Our Exotic Poplars.

A number of exotic species have been introduced into this country of which the most familiar are the Silver poplar (P. Alba) and the Lombardy poplar (P. Nigra variety Italica). These have been brought in from Europe by the early settlers and are now found growing all through the older settled portions of Eastern Canada. More recently several species from Russia have been intro-



A "pole forest" of Aspen Poplar on the North Pine River, Peace River, Alberta.

duced into the Prairie provinces. These include the P. petrovski, P. certinensis and P. wobstiriga. They are difficult to distinguish one from the other and commonly all go under the name of Russian poplar. The silver or white poplar (P. alba) derives its name from the silvery velvet under surface of its maple like leaves which is in sharp contrast to the very dark green and shining upper surface. This downiness is not confined to the leaves alone but covers the buds and twigs and makes the tree readily distinguishable even in the winter. The silver poplar is a good sized tree from 40 to 75 feet high and a diameter of 2 to 4 feet and has been extensively planted throughout Eastern Canada and the New England States. In common with many of our native cottonwoods it has the bad habit of sending up root suckers and thereby proving itself a nuisance near a lawn or garden.

The Lombardy.

The Lombardy poplar so named because it was originally believed to have come from Lombardy is now said to be a native of the high mountains of Afghanestan. It has been much planted in this country for ornament because of its vertical habit of growth which has given it the name of the exclamation point among trees. The spire like habit makes it readily distinguishable from all other trees. When young and vigorous it has some value in landscape planting but when older it often becomes unsightly because of the many lower dead and leafless branches which it retains.

The three Russian poplars are very hardy and in many sections of the prairies appear to withstand the winters even better than the native cottonwood. Their habit of growth and general requirements are very similar. When young their growth is extremely rapid, cuttings often reaching the height of 20 to 25 feet in from eight to ten years. Unfortunately, however, these trees are subject to early decay, particularly when growing on heavy clay land and this fact discourages the setting out of extensive plantations unless it is to obtain quick results as a shelter belt or to produce small sized material for fuel. However since they make rapid growth and are easily propagated from cutting, decayed trees can be replaced in a comparatively short time by younger ones.

B. R. MORTON.



How Regina's handsome legislative buildings are enhanced by a park of thriving trees.

Prairie Tree-Planting and Profits from Live Stock

(An Interview with Dr. Rutherford of the Board of Railway Commissioners, formerly Veterinary Director General of Canada)

The Canadian Forestry Association has been directing considerable attention to the subject of tree planting on the open prairies of Western Canada for shelter purposes for the crops and for beautifying and rendering more comfortable the homes of our Western farmers and ranchers. The importance of the relation of shelter belts to the live stock industry has perhaps not been sufficiently emphasized and the following remarks embracing the opinion of such a well-known authority as Dr. Rutherford should prove of interest and value to our Western readers.

According to Dr. Rutherford, there can be no doubt as to the advantage of judiciously planted windbreaks to live stock for their protection and for the growing of forage; and such windbreaks should, in his opinion, be planted around barns, outbuildings and corrals on the bald open prairie. Cattle, like most human beings, are very susceptible to the bitter cold winds which blow across the prairie in winter and an efficient windbreak of trees planted around the corral or cattle sheds is sufficient to afford the necessary shelter.

In Manitoba there is, as a rule, sufficient natural shelter in the shape of bluffs of Poplar, Willow, etc., to which the cattle or sheep can go for protection against the cold winds, but on the open prairies in Saskatchewan, and particularly Southern Alberta, the natural shelter is seldom available.

Protection from the wind in the shape of efficient windbreaks of trees is all that is necessary to maintain live stock in a state of health and contentment.

The relation of tree shelter belts for the growing of forage for live stock is also a very important one. It has been found extremely difficult to successfully grow corn without adequate shelter. Experiments with the growing of sunflowers conducted by Dr. Rutherford



Kananaskis Fall, Bow River.

many years ago in Southern Alberta are most interesting and bear directly on the tree shelter belt question. He sowed a row of sunflower seeds against the prevailing winds or to the westward of his crop of corn. Next to this shelter belt of sunflowers he sowed a few rows of corn, then another belt of sunflowers and more corn.

By increasing the density of the shelter belt or increasing the number of rows of sunflowers, it was found that corn could be successfully grown. This was how sunflowers came into use for siloage as Dr. Rutherford mixed the sunflowers with the corn and found that his stock thrived on the mixture.

Dr. Rutherford laid special emphasis on the importance of windbreaks around the farm dwellings, stating that the greatest argument in favor of the planting of windbreaks on the prairie was in making the home a comfortable place in which to live. "A home is not a home" said he "if, when one steps out the door, he is met with a strong biting wind. The children can not enjoy a romp in the outdoors about the house and the live stock are devoid of the shelter they require." Contrast this state of affairs with a farm where the dwelling house, barns, outbuildings and corral are all strongly fortified from the cold prevailing winds, by an adequate windbreak of properly planted trees. There can be no doubt as to the substantial advantage of tree windbreaks on the bald open prairie to man and beast.



"Forests are the butand rein of streams." The regulation of stream flow is the function of forest growth on the watersheds. Kill that forest growth by the plague of fire and you forfeit the reliability of the annual flow.

How Fast Does a Planted Forest Grow?

(By Ellwood Wilson)

There has been much discussion as to the practicability and cost of reforestation by planting and also of the time which must elapse before a crop could be expected. Unfortunately in Canada we have only made a beginning and sufficient time has not elapsed to give us much idea of the rates of growth of planted forest trees. The accompanying table of measurements made on Norway spruce planted at Axton by the Cornell Forestry School under the direction of Dr. Fernow, goes to show that the predictions for planted trees made by the writer are amply conservative. The table shows that on good soils a thinning of two or three cords per acre might be made at 25 years and that even on the poorest soils at twenty years of age the total wood per acre is above the average for what can be cut, under Government diameter limits in Quebec on Virgin Forest lands.

It may be interesting to note that on a Scots pine plantation made in 1913 by the Laurentide Co., on the poorest sandy soil spaced 6 x 5 feet now shows an average growth of seven and a half feet in height and 2.35 inches in diameter six inches above the ground, and a volume of 71 cubic feet or over half a cord of solid wood per acre.

Norway spruce planted in 1914 has an average height of 50.6 inches and average diameter six inches above the ground of 1 inch. The average increases in height for the past year has been 11.83 inches.

The Commission of Conservation is annually measuring the growth of planted trees on Laurentide Company's lands and this information will be regularly published for the benefit of those interested.

Summary Data on growth of Norway Spruce at Axton

All figures reduced to per acre basis.

Plot No.	Area Acres	Age Years	Aver. D.B.H Inches.	Average height. feet.	Site Quality Scale of 5.	Cords Yield Table.	Aver. Cords per acre per year.
X	.25	25	6.5	45.4	I	23.68	.95
202	.25	18	2.73	18.0	I	15.89	.88
219	.50	16	1.8	14.0	I	10.63	.71
216c	.30	20	3.1	14.0	II	13.03	.65
201	.30	18	1.5	14.5	II	13.03	.65
203	.50	18	2.3	14.0	II	13.03	.65
212	.25	20	2.3	13.5	II	13.03	.65
207	.25	20	1.4	9.5	III	10.16	.51
215	.275	20	1.7	9.0	III	10.16	.51
208	.50	20	1.3	9.2	III	10.16	.51
214	.50	20	1.3	9.8	III	10.16	.51
209c	.25	20	1.25	6.9	IV	7.31	.37

Plot X—Planted in 1897 with three-year-old transplants, spaced 5 x 5. The plots have been thinned at intervals for Christmas trees.

Plots 201, 202, 203—Waste pasture lands planted by students.

Plots 207, 208, 209c—Planted on land burned after logging in 1894 under cover of Aspen and Paper Birch.

Plots 212, 214, 215, 216—Planted under cover of Birch and Popple on an old Burn.

Plot 219—Planted on area clear cut and brush burned after logging.

Plot X—Located on the lands of C. F. Dietrich, at Millbrook, Dutchess County, New York.

Plots 201, 202, 203, 207, 208, 209c, 212, 214, 215, 216, 219—Located near Axton, New York. (Cornell Plantations.)

Progress of the Empire Forestry Association

The Empire Forestry Association has become a working reality. The headquarters of the Society are in London, with Mr. M. C. Duchesne, a most capable representative, as Honorary Secretary.

An interim committee was elected, consisting of the following:—

The Earl of Plymouth, the Earl of Selborne, Sir John Stirling Maxwell, Bt., and Lieut.-Col. G. L. Courthope, M.C., M.P., representing the United Kingdom.

The Duke of Devonshire, Mr. Robson Black, and Col. Beckett representing Canada.

Sir Claud Hille, K.C.S.I., C.I.E., representing India.

Sir Mayson Beeton, K.B.E., representing Newfoundland.

Mr. H. R. Mackay, representing Australia.

Lord Islington, representing New Zealand.

Lord Buxton, representing South Africa.

The temporary offices of the Empire Forestry Association are at 17 Victoria Street, S.W., London.

The chief object of the Empire Forestry Association is to promote and develop public interest in forestry throughout the empire. The specific purposes may be enumerated as follows:—

1.—To create interest in and circulate information relating to Forestry amongst all classes in the British Empire.

2.—To bring about better public recognition of the identity of interest between continuous timber supplies, and systematic forest management, and to spread information relating to the commercial utilization of Empire-grown timbers.

3.—To form a centre for the Empire for those engaged in Forestry, and create a means of communication between the various sections in all parts of the Empire.

Membership is open to organizations and firms and individuals interested in forestry or in the commercial utilization of timber and other forest products.

The Canadian Forestry Magazine believes that the Empire Forestry Association, which has intentionally avoided identification with Government forestry bodies in the interests of greater freedom of action, is certain to perform a service of far-reaching importanee. Not only will there be cultivated a popular interest in the necessity for constructive forestry policies in all parts of the Empire as a matter of mutual safety and prosperity, but the work of such an association is bound sooner or later to affect the trend of Empire trade in forest products and bring about closer commercial relations between the United Kingdom, which is the great consuming centre of wood products, and such fields of potential supply as Canada.



The abandoned farm, a familiar sight in many parts of the Dominion. This illustrates the double penalty of allowing settlers to take up land not previously examined and classified. It is a startling fact that Canada has more acres originally cleared for farming that must now be put back under timber than she has land under timber that can be made useful for agriculture.

Forest Fires--and Our Educational Patrol

Our readers who have followed the widespread programme of educational work carried on by the Canadian Forestry Association, will be interested in the news received as to our Forestry Exhibition car with a Lecture Car attached, which have been touring in Central Quebec. The work of the cars will be concluded in December, as weather conditions make a winter railway itinerary practically impossible. It is hoped to start the 1921 tours both in Eastern Canada and the Prairie Provinces in the month of May.

At Berthier: Car attended by over 300 in the afternoon; 200 students from Academy attending lecture and motion picture demonstration. A second lecture to one hundred children was given immediately afterwards.

In the evening the exhibition car was visited by about 500 people, two meetings being held in the lecture car with crowded audiences. Dr. Jervais, M.P., attended one of the lectures and gave a short address to the audiences.

AT THREE RIVERS, owing to the excellent co-operation of Mr. Henry Sorgius, Manager of the St. Maurice Forest Protective Association, large audiences were encountered.

During the first afternoon 700 people visited the Exhibition car. Mr. Valin assisted by Mr. A. G. Cooch, held a meeting of 400 pupils and teachers at LaSalle Academy. In the evening 500 people visited the Exhibition car and two motion picture talks w re held in the lecture car.

On the second day at Three Rivers 500 people visited the Exhibition car and a forestry lecture with motion pictures was given to 500 students, and professors of the Seminary. The meeting was honoured by the presence of M. Le Superior, who addressed the audience after M. Valin's speech.

Evening lectures were given at 7 p.m. and 8.30 p.m., to 300 people and over 250 persons passed through the Exhibition car at the same hours.

AT SHAWINIGAN FALLS four lectures were given during the afternoon to relays of students from local schools and academies. The total attendance at the four lectures was 700. During the evening approximately 1,000 persons visited the two cars. On the following morning a special meeting was given to 100 pupils and teachers from the Brothers' School.

AT GRAND MERE in the afternoon, a motion picture lecture was given at the English school by Mr. Black, while Mr. Valin addressed some 600 pupils at the Brothers' School. In the evening a French lecture was attended by 300 people and this was followed by an English address to another audience. The attendance at the Exhibition car was large, more than 1,100 people passing through.

On Saturday morning November 20th, at Grand Mere, 600 students visited the Exhibition car; during the day another 800 people were present to see the exhibits and attend forestry protection lectures.

At Grande Piles the attendance at both the Exhibition car and the motion picture lectures in French was one of the heaviest yet recorded.

Other points yet to be covered at the time of going to press are St. Tete,, St. Thecle, La Tuque, Flamand, Windigo, Vandry, Parent, Greening, Joliette and Lachute.

Annual Meeting

of the Canadian Forestry Association will be held at the Windsor Hotel, Montreal, Thursday, January 20th.

Hitching Science to Forest Management

By Ellwood Wilson
Chief Forester the Laurentide Company, Ltd.



Pulp and paper industries must maintain their woodlands on "sustained yield" basis



The whole question of the improvement of logging operations is more or less psychological; that is, it is a question of men's minds and men's way of thinking about things rather than any practical question of method or operations.

For instance, the men who have been operating in the woods in the past are men who have, to a great extent, grown up in the woods and they have been more or less supposed to have some sort of occult faculty, some sort of super sense which particularly fitted them for the work in the woods. In my experience, that has not proved to be true, and the time has come when the operations in the woods must be placed on the same basis as operations in the mill. Nobody would think today of running a big paper mill without trained chemists, without trained engineers, without trained cost accountants, etc., but up to this time we have not had this class of men in the woods. We are only just beginning to realize that logging, after all, is a branch of engineering, that it requires a certain amount of technical education, a certain amount of technical training without which nobody can be a successful logging operator. We have got to realize that fact, and with all due honor to the men who have kept our mills supplied with raw material, the day has come when we must change our methods and get more men with technical training in the woods.

Cheap Logs! Cheap Logs!

In the past the question has been to get out raw material at the lowest cost possible, regardless of anything else. The managers of the mills have said, "We want so many thousand cords of wood a year," and if logging costs went up the least bit, there was immediately a 'holler,' and the man responsible for getting the timber out of the woods and into the mill was hauled over the coals if his costs were a little more than in the past. Conditions under which labor has worked in the woods have been very difficult and we have come to realize today that the men who work in the woods must have the same comforts and the same decent living conditions that the men who work in the mill have.

We have come to face a good many difficult problems and in the solving of these problems, we want the very best trained minds that we can get, but we have to do away with old-fashioned ideas, with old superstitions and with old fetishes; we have got to face these problems in the same way that we have faced engineering and operating problems in our mills.

What Progress in the Woods.

In the woods operations we have made absolutely no progress so far as I know since we first began logging in the old days. We are using the same methods of hauling and almost the same methods of cutting. We have to some extent, of course, substituted the saw for the axe. There has been some effort in the East to use tractors in logging. Of course we have to leave out of this discussion the large timber operations in the West in which machinery of all sorts has been used and where they are costing more and more to do away with hand labor.

In the previous years our labor costs have been so low that we have been able to use man power and horses to a very large extent, but the day of that practice is almost past and what we need now in

our woods operations is men who will think out new mechanical methods for getting out the small amounts of timber per acre which stand in our Eastern forests so that we can cut down the expense of our logging operations.

The Yield of the Future.

Another thing which is of the utmost importance is the question of the continued yield of our forest lands. In the language of a forester, we have got to come to a basis of sustained yield. We are not going to be able any longer to mine the timber from our forests as we have mined our coal and metals and oil. The forest is not and never was intended to be mined; it is a growing crop and it must be handled on entirely different lines than our mining operations.

In order to do this and do it practically, there have got to be some laws in logging enforced so that the forest after logging will be left in a condition where it can continue to produce trees. The time has gone by when we can go into the forest and cut down trees here and there and everywhere, burn up the forest by carelessness. We have got to leave the forest in a condition to give us another crop and not only another crop but a crop in the very shortest possible time.

A Temporary Rise in Cost.

In order to do this, we have got to adopt some selective system of cutting. This, of course, will naturally raise the cost of our timber, but only temporarily, mind you. Once this system is established, the cost of logging instead of rising constantly as it does at the present time, will more or less average itself out over a series of years. To make this clear by an example, take a new tract of territory and follow out its history. Especially as we have logged in Eastern Canada, going into a new tract, a logging operation would commence on a river or on a lake and all of the timber which could be gotten out easily and cheaply would be taken out the first year at a very low cost. The second year the operating would have to go back a little further with rising costs. The third, fourth and fifth years, it would be necessary to go further back, with the costs still rising.

If the timber had been taken out back to the watershed the first year, the cost of that year's operations would have been great, but all the timber from the river right back to the end of the operation would have been brought out at once. The next year the same thing would have been done with costs approximately the same, so that while the cost would have been higher the first year, over a series of years the cost would have been uniform.

The Jobber to Blame.

Everybody knows that when you let a contract to a jobber or contractor to go into the woods, he is not going to care about your interests at all; he is going to take out the timber which it is easy for him to get out and which will net him the biggest profit, and this system of using contractors and jobbers has been the ruination of more forest areas than anything else I know of. It was an easy way to get out the logs and a fairly cheap way, but when you consider the results in the long run, we are going to be a great many years in paying for that sort of logging operation.

I would like to prophesy a little bit as to the future of logging operations. From what I can see of the trend of affairs in the West and some of the things which are taking place in Scandinavia, and when I think of what has been accomplished in the change of methods in our paper mills and in our great industries, I look forward to the time when our logging operations will be carried on much more by machinery than they are at the present time. I think we are just on the verge of having a mechanical saw which can be carried around easily from tree to tree and with which one or two men can do the work of a dozen. I think that it will only be a very short time until we will have a machine very much like the pneumatic or electric drill at the present day with which the branches can be taken off the trees and can be swamped much more economically than at the present time. I think that American ingenuity will very soon develop types of tractors or mechanical haulers which will enable us to get our timber out to much better advantage and much cheaper than the present method of skidding it out with horses.

Woods Practice Today.

You all know that the forest today is a collection of good trees and trees which, up to the present time we have found no use for. In order to log to the best advantage today, we have to cover very large areas to get a relatively small amount of timber and I feel sure that the practical men, the business men of today will very soon come to realize the futility of covering ten or twelve square miles to get a small cut of timber and they will come to the opinion that was expressed in England at the Imperial Conference this year by forty out of fifty-five delegates that the day of natural reforestation is very rapidly nearing an end.

Where Planted Forests Save.

This is a very broad statement but at the same time when you come to analyze the situation I think you will, after due consideration, more or less agree with me on this matter. You take large areas of timber and suppose you get from them an average of from five to six cords to the acre as we do in Canada—where we cut under certain Government diameter regulations—you have got to take your men into the woods, take your provisions long distances and cover large areas in order to get out this five, ten or fifteen cords to the acre. When you stop to consider that after you have taken out that timber you have got to wait forty or fify or sixy years for another crop which, so far as anybody knows at present will be but a very small fraction of the crop which you have taken out in your first cut, you have got to cover these huge areas to get the timber you need. It would not seem economical or practical to you, and you will surely come to the idea which has been forced on the experience of European countries, that if we are going to carry on our industries, the best way to get the timber is to get areas as near the mills as possible. Plant the areas with the very best possible stock you can get with the very largest amount per acre and then when your logging proposition comes along, look how the whole thing is going to be simplified! Instead of driving or hauling or railing your wood all the way from fifty to 200 miles, let us say, you are going to be able to go out within ten or twenty miles of your mill, put in your portable electric railway, utilize machinery which will cut your trees down just the way you cut your corn crop today, and you are going to get instead of five, ten or fifteen cords per acre, forty or fifty cords. You will reduce your logging costs and simplify all of your operations. Instead of huge wood piles which we see in some of our Northern countries to carry us through the winter, with insurance and money tied up in them, we are going to take the wood right straight from the stump to the mill. We are going to utilize a tree the same day it was cut, perhaps, or the day after.

The Future in Our Hands.

I know that a great many people will be skeptical but when you come to study the whole thing out carefully and to get right down to brass tacks in the matter, you are going to see that for the future this is going to be the ideal method. You can say, "Of course we won't live to see this; what business is it of ours to provide timber for the next generation"; you can make the same reply that has been made to me many times by managers of wood land departments, "What do I care about this, my job is to get wood as long as I am working for this company and when my successor comes along, let him face the problems that are created by the way I am logging today."

I have heard managers of companies talk in that way, but today we are coming to realize that we cannot shirk the responsibility of the next ten or fifteen or twenty-five or fifty years. We have no right today to create a set of conditions which are going to be difficult for our successors. It is not honest; it is not good citizenship; it is not good business.

The paper and pulp industry is, to a great extent, a stabilized industry which in all human probability ought to go on for generations. The mills and the tremendous installations which we have today should not be scrapped in ten or fifteen or twenty-five years, they ought to go on functioning for several generations to come and people who own woodlands certainly have a responsibility to see that those woodlands are kept in productive condition. (An address at Chicago before the American Paper and Pulp Association.)



Does this sort of thing pay? Here is a piece of natural forest land which should never have been taken out as a farm. The settler only wasted his years of labor and killed a productive patch of timber.



ONE OF OUR MANY DESERTED FARMS.

The land was designed for timber growing, and was too poor for field crops.. For lack of land classification in advance of settlement, the province lost the timber producing value of the land and the constructive service of a good farmer. Notice how the old fields are being reforested naturally with spruce.

Aeroplanes Feature in Quebec's Policy

At a recent conference of foresters from Eastern Canada and the United States, held at Grand Mere, Mr. G. C. Piché, Chief of the Forest Service for the Province of Quebec, outlined the forestry policy of the new Prime Minister, Hon. L. A. Taschereau. Mr. Piché dwelt principally upon the monetary value of the wood-using industries to the province, especially referring to the pulp and paper industries. Mr. Piché pointed out that the provincial government was determined to prevent the timber resources of the province from being wasted or over-exploited and to take full advantage of the opportunities now presented for turning the forest resources into actual wealth. It was also stated by Mr. Piché that Forest Posts would shortly be established at Hamilton Bay, Ungava Bay and James Bay, from which foresters will go out and make inventories of the forest resources of the province. These posts will be connected by wireless telegraph, and will have the assistance of aeroplanes, which will be used to make photographic surveys. The forest industry holds the second place in the Province of Quebec from the standpoint of value and products. It is now generally recognized that the forest industries of the province are entering upon the most prosperous period of their history. The next few years should witness a remarkable growth in these industries with attendant increase in the general prosperity of the Province.

Death of A. S. Goodeve.

A most valuable friend of the forest conservation movement was lost in the death of Mr. A. S. Goodeve, a member of the Board of Railway Commissioners and Director of the Canadian Forestry Association. Mr. Goodeve's interest in the Forestry Movement was reinforced by his membership some years ago in the British Columbia Forestry Commission, which conducted an inquiry into the forest resources of British Columbia and drew up an authoritative report on which the reorganization of the Provincial Forest Service was based.

A regular attendant at the meetings of the Directors of the Canadian Forestry Association, Mr. Goodeve's counsel was of the utmost advantage and his enthusiasm for educational propaganda was a great stimulus to the Association's executive staff.

He was an astute judge of men and affairs and maintained in his official and personal relations a cordial and sympathetic manner.

Mr. Goodeve's record of service to the cause of forestry was particularly emphasized in his work as a railway commissioner. The work of railway fire prevention came directly under his charge and gained greatly through his deep conviction that the guarding of the timber resources from all forms of destruction was an obligation of primary importance.

The Directors and Officers of the Canadian Forestry Association were represented at the funeral and a wreath of flowers was sent as an expression of the profound regret of his association colleagues.



One of the foundations of the British Government's afforestation programme in the United Kingdom: the Kingswood Nursery at Dunkeld, Scotland. The British Forestry Commission's nurseries are excellently planned and managed.



P. Z. Caverhill, recently appointed Chief Forester of British Columbia. Mr. Caverhill has a highly successful record.

The First Christmas Tree

A pretty legend is handed down about the first Christmas tree. When Ansgarius preached the "White Christ" to the Vikings of the north the Lord sent his three messengers, Faith, Hope and Love, to help find the first tree. They were to seek one that should be as high as Hope, as wide as Love and that bore the sign of the Cross on every bough; so they chose the balsam-fir, as it met their requirements better than any other tree in the forests.

To Buy All Wood by Weight.

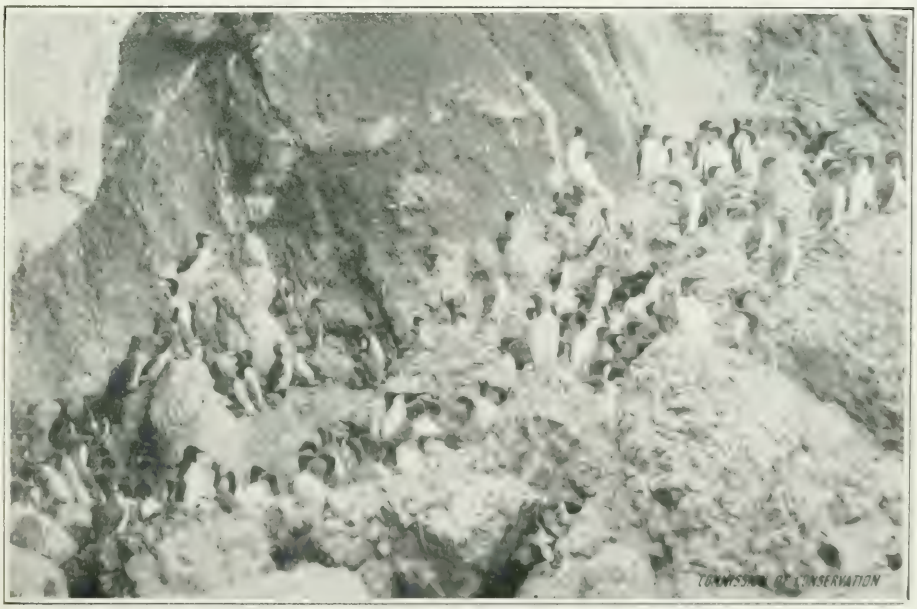
Mr. R. S. Kellogg, Manager of the Newsprint Service Bureau of New York, speaking at the meeting of the American Paper and Pulp Association, predicted that the time was not far distant when pulp wood logs and all rough wood going to the factory and mills will be bought by weight and the "cord" and the "foot" will become obsolete in the woodsman's language.



Forest and stream in Canada's Northland; one of the Fort Smith Rapids on the Slave River.



Red Rock Rapid on the Saskatchewan River.



California Murres typical resting place of an Oregon [illegible]

Lumber Prices and the House You Want to Build

It has been charged to the lumbermen that the reason building operations have not been conducted on a larger scale in various communities where the scarcity of houses is so pronounced, is that lumber has been too high in price and that consequently structural operations have been retarded. On the surface the average man thinks this allegation is a just and timely one and, therefore, the lumber dealer has to bear the brunt, for he gets all the blame. What are the facts? The per cent. cost of lumber in a house varies, of course, according to local conditions and the nature of the structure, but the per cent. cost is after all a relatively low item. On the average brick dwelling, the outlay for wood products ranges about one-fifth of the entire outlay. The bill for lumber on a $12,000 house represents 19 per cent. of the total cost. On a $10,000 dwelling the increased outlay for lumber, including interior and exterior trim, would not be more than $600 or $700 at the most over the prices which held sway in 1912. Plumbing, heating, electric wiring, hardware, glass and all other commodities have risen much more in proportion than lumber.

It is also pointed out that any person who builds even the most unpretentious home in these days demands a great deal more in that house than was formerly necessary. The average man calls for more in the way of exterior appearance and interior furnishings. The days of the coal oil lamp, the tin bath and the wood stove are ended. A square type, plain finished house with old style roof will not answer—in fact, would not be considered by a citizen planning to build a home of his own. Straight lines and square finish have been numbered among the things of yesteryear, and now in an estimate of building, there must be sleeping porches, cut-up roof, alcoves, attractive approaches, linen chutes, etc., while an estimate of building a house usually includes the heating plant, electric wiring and fixtures, a bath room fitted with fixtures as expensive as living room furniture, casement windows, panel effects, beamed ceilings, plate rails, wainscotting and even parquetry, with hardwood trim, polished floors and brick fireplaces—all of which effectively disposes of the slander that lumber costs too much to build to-day.

The query is often asked: Should I build now? And those who have given sane consideration to the subject in all its aspects say that it is always good policy to build "what you need, when you need it, and only what you need." If you require a home or your property urgently needs repairs, do not wait. Even should lumber decrease a few dollars in price, it will make no material difference in the average edifice.

Statistics reveal that approximately 55 per cent. to 60 per cent. of building cost is labor, and the question projects itself: Will this item be reduced? As already pointed out, people who are expecting pre-war prices will be disappointed, as we are living in a new era and must accustom ourselves to new conditions and surroundings. Irving Fisher, who is possibly, America's first authority on the subject of prices, says: "Go ahead on the new price level. Business men should face the facts. To talk reverently of 1913 and 1914 prices is to speak a dead language to-day. The buyers of the country since the armistice have made an unexampled attack upon prices through their waiting attitude, and yet price recessions have been insignificant. The reason is that we are on a new high price level and it will be found out that the clever man is not the man who waits but the one who finds out the new price facts and acts accordingly.'

Another shot fired at the lumberman from ambush is that his profits are excessive and that he is in the business

which creates wealthy men within a comparatively short period. A record and study of the lumber industry reveals that there have been many reverses in that branch, and perhaps more than in any other allied vocation. More foolhardy ones venture into the lumber arena than any other industrial calling and come out of it with a vastly different conception of its potentialities and realizations than when they set sail. True, a few fortunes have been made, but scores have been lost, and if the lumber manufacturer reaps a larger profit than those in other endeavors, it must be remembered that he takes a bigger chance. It is sad, indeed, to shatter a popular delusion, but the number of rich lumbermen is relatively not nearly as large as that of those engaged in numerous other lines where the returns are more liberal without any of the speculative spirit, the play of fortune and the freaks of the weather. In sporting propositions the man who takes the longest chance is given the greatest odds, and more money can be lost in a sawmill venture than in perhaps any other. A drop of a few dollars in quotations may in a night wipe out the earnings of a lifetime. To those who accept the greatest hazard, the largest spoils go, and the risks that the lumberman has to face are little known or thought of by the general public. The lumber operator encounters too much or too little snow in winter and the absence of rain in the spring; the scarcity of labor, its restless attitude and frequent exactions, embargoes, increased freight rates and transportation tie-ups, car shortages, varying demand, and supply abroad and at home, fire, flood and hurricane, heavy loans and a score of other contingencies, all of which may change conditions in a twinkling.

The writer holds no brief for the defence of the big lumber operator, but has sought to present frankly some of the conditions with which he is confronted at this juncture, and to answer effectively the charge frequently laid at his door of being responsible for building inactivity, shortage of homes and the halt in industrial expansion. — "Financial Post."

Aircraft for Forestry Purposes

Aerial Reconnaissance and Photography for the Woods Department of the Spanish River Pulp and Paper Mills Ltd., in Northern Ontario.

During the summer season of 1920 the Spanish River Pulp and Paper Mills operated a flying boat for the purpose of ascertaining the value of aerial reconnaissance and photography in woods operations.

The boat, an Aeromarine 44L, was launched on June 2nd and a trial flight was made on the same day. Delay in obtaining the Eastman K-1 Aero Camera held back the photographic work until July. Five hours and fifteen minutes only were spent in photographic flights. During this time forty-one square miles of terrain was photographed. Approximately eight hundred square miles was extensively reconnoitered during the summer. Delay in obtaining a developing tank has prevented the development of the exposed films, and therefore the construction of a key, absolutely essential to the interpretation of aerial photographs.

During the season 43 flights were made. During these flights, covering in all thirty-seven hours and twenty-five minutes, the machine was flown two thousand miles. Sixty one passengers were carried. There were no "crashes" and no one was injured during the summer's work.

The experiment in aerial reconnaissance and photography, though of short duration, has proven of such value that the work will be continued by the Spanish River Pulp and Paper Mills during the flying season of 1921.



The tree-bordered waters of the Rideau Lakes.

The Warning Finger of China

(An Editorial in the Toronto Globe)

The perpetuation of the forests as a safeguard to the soil in the timbered areas now being disposed of is the problem of prime importance, but it is receiving very little thought from our public men The finger of warning, however, is pointed toward Canada from the most anciently inhabited quarters of the globe. Think of the tragedy of the famine in China, where, before the next harvest can be reaped, ten, perhaps fifteen, millions of souls may perish of starvation. Then realize that this calamity is the slow but sure accumulation of centuries of ignorant forest waste on the plains and in western hill regions of China. And with all the skill of modern engineering, decades, running into centuries, will be required to restore the disordered balance of Nature.

One of the most mournful monuments of human folly and ignorance in mistreating the bounties of the earth is to be seen in a section of Syria about fifty miles square, of which the old city of Antioch is nearly the centre. That city once had a population of 200,000, now it has about 20,000. From the hill overlooking the ruins of this city the eye may range over seven other hills whose slopes contain the ruins of 150 cities and towns once teeming with prosperous communities. The symbols of a vanished wealth are visible on every hillside; vats for wine from the choicest grapes that fed the epicures of Rome, olive oil vats by the hundred, and ruins of baths among the colonnaded palaces of the rich. The living remnants of these populous sites are squalid, dirty and destitute to a degree.

Whence all this decay? Destruction of the forests which once clothed these hillsides. We know it from some of the most dramatic events of history. From these hills were taken the "cedars of Lebanon" which were imported to Palestine to build Solomon's temple at Jerusalem. The cedar wood was so admired that after the first temple was built the slopes of these hills continued to be stripped to furnish the interiors of private palaces of Jewish Kings, Roman nobles and Governors. When the protecting covers of the hill forests were stripped the freshets washed away the thin skin of soil down to the rocks, and the desolation now to be seen was inevitable. It took a millennium to build up this fertility, but it only took a few hundred years to accomplish the destruction. It will take another thousand years to make restitution to violated Nature and grow again the cedars of Lebanon, whose half-dozen trees represent all that is left of the glory of the departed age.

We have no stones to throw at the people of China and Syria in regard to the abuse of the bounties of Providence. There are many square miles of hill country in New Brunswick, Quebec and Ontario, where, through foolish forestry methods, including criminal forest fires, the surface soil has already been washed down to the rivers and the sea. In some of these situations it will take a century of careful replanting before the process of soil restoration can make even a beginning.

Our duty to the forest was divinely indicated by the injunction "replenish the earth and subdue it." It is folly inexcusible to invade a forest where Nature has already laid the foundation of replenishment and bring desolation where culture is called for. The Provinces of Canada should not permit the exploitation of timber lands without making the condition that the hills in forest tracts shall never become bald heads, but shall be kept in perpetual youth by State regulation and restoration. We cannot afford to trifle with the alternative, which would in one fatal lapse invoke the day of devastation of forest lands and cripple the priceless asset of our water powers.

Why Farm Forestry Pays

The right handling of forest trees on the farm will make it more prosperous, add to its comforts as a home, and enhance its value as an investment.

The home forest, in many sections of the country, will supply the timber which the farm needs for buildings, fences, fuel, repairs of all kinds, and many other uses; and there will often be a surplus which can be sold in the form of standing timber, saw logs, posts, poles, crossties, pulpwood, fuelwood, and blocks or billets for making spokes, handles, spools, boxes, barrels, and excelsior.

A well-cared-for home forest serves also as a windbreak for buildings, a shelter for live stock, a protection of valuable lands from erosion, a means of profitable employment for men and teams during otherwise spare or idle time, a place of recreation, and an improvement in the appearance of the farm.

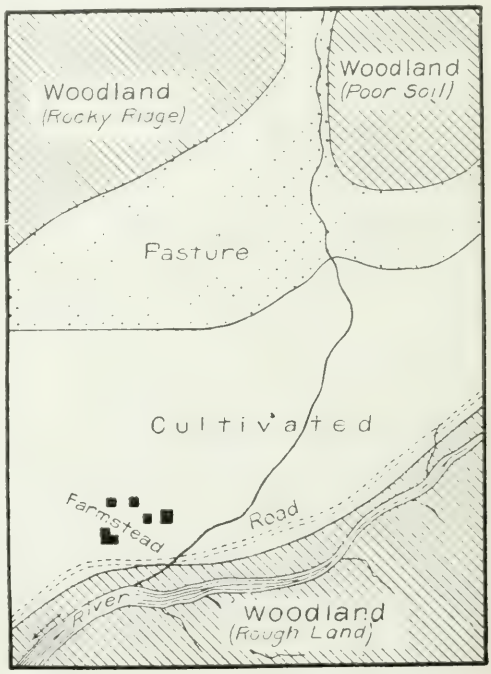
Trees improve and build up the soil. The leaves, small twigs, and other tree litter decompose and form a layer of dark-colored vegetable mold, which enriches the soil and stores up soil moisture. By means of this layer of mold, the binding of the soil by the roots of the trees, and the resistance of the trunks to the rapid flow of water, the woods prevent floods from gullying or destroying the land by erosion, particularly on steep slopes.

Even if a farmer sells no timber the woodland pays. The firewood, fence posts, and material for repair and construction on the farm, the timber and money saved by having them conveniently on hand, and the protection against extremes of weather afforded the crops, farm buildings, and stock are worth considerably more than the slight trouble and expense of raising and caring for the trees.

The woods need not occupy good farm land that will grow other crops. Trees should, as a rule, be located on land too poor to cultivate, such as gullied or very rocky land, swamps, steep slopes, and barren soils. Unused corners and small uncultivated spots about the farm are good places for rapid-growing, useful trees. The chief economic reason for timber growing on the farm is to get a profit from those portions which would otherwise be unproductive.

Though the land on which the farm forest is situated may not be suitable for other crops, it should not be treated as waste land. (Fig. 1.) By a little care it can be made to produce valuable timber. Only a little attention is required, and this may be given in the winter or when other farm work is slack. Forest trees and woodland are more valuable now than they were a few years ago. Many trees that used to have little value, and even small trees that used to be counted as brush to be got rid of, are now in good demand.

—U. S. Forest Service.



NO IDLE LAND ON THE FARM.
Woodland on the hills, pasture land on the slopes, and cultivated land below.

An Ode to a Telegraph Pole

Slushly is the highway between the unspeakable hedges;
I pause
Irresolute under a telegraph pole.
The fourteenth telegraph pole on the way,
From Shere to Havering,
The twenty-first from Havering to Shere.
Crimson is the western sky; upright it stands,
The solitary pole,
Sombre and terrible,
Splitting the dying sun
Into two semi-circular halves.
I do not think I have seen, not even in Vorticist pictures,
Anything so solitary,
So absolutely nude;
Yet this was an item once in the uninteresting forest,
With branches sticking out of it, and crude green leaves,
And resinous sap,
And underneath it pine spindles
And ants;
Birds fretted in the boughs and bees were busy in it.
Squirrels ran noisly up it;
Now it is naked and dead,
Delightfully naked,
And beautifully dead,
Delightfully and beautifully, for across it melodiously,
Stirred by the evening wind,
The wires where electric messages are continually being despatched
Between various post offices,
Messages of business and messages of love.
Rates of advertisements and all the winners
Are vibrating and thrumming like a thousand lutes.
Is the old gray heart of the telegraph pole stirred by these messages?
I fancy not.
Yet it all seems very strange,
And even stranger still, now that I notice it,
Is the fact that the thing is after all not absolutely naked,
For a short way up, half-obliterated with age,
Discolored and torn,
Fastened on by tin tacks,
There is a paper affiche
Relating to swine fever.
The sun sinks lower and I pass on,
On to the fifteenth pole from Shere to Havering,
And the twentieth
From Havering to Shere;
It is even more naked and desolate than the last.
I pause (as before).
(Author: We can start all over again now if you like.)
(Editor: I don't like.)

—From Punch.

Some Forest Fables!

No. 2

By Dr. C. D. Howe

Once upon a time a business man had many manufacturing establishments scattered all over the country. He made a great many different kinds of articles and all these articles were made of wood. The articles were very well made and were very useful. The people bought them eagerly and paid high prices for them. The business prospered and the manufacturer of wood products became very rich. In fact, there were only two other men in the country richer than he.

It will be seen that he was very careful and business-like in his methods, otherwise he would not have made so much money. His factories were well organized; each workman was carefully trained to do his bit; he did it well and was paid accordingly to the value of his service. Since the manufacturing establishments were so valuable and were such big money earners, they were well protected against loss by fire. In some places as in sawmills, bucket brigades were organized; in others like planing mills, connections were made with high pressure water-mains; in paper mills automatic alarms or automatic sprinkler systems were installed. The more valuable the property to be protected, the more the money expended in protection against fires.

This manufacturer got all his raw materials out of which he made so much money by using thought and care and labor, from trees of various kinds that grew in a forest. He didn't own any trees; he had to buy them from another man and that other man owned many, many acres of trees; in fact, most of the best trees of the country were in his possession.

Now, unortunately, in sharp contrast to the successful manufacturer, the owner o fthe trees was rather slothful and unbusinesslike in his methods. He did not require efficiency or skill in his workmen and he paid them low wages. In the matter of fire protection, for example, we have seen how the successful man manage that, but the owner of the trees, on the other hand, would put a decrepit old man and a young boy in charge of a forest that contained trees worth $1,000,000. They, of course, were helpless when the fire came and the forest would burn. In fact, so many trees burned under this kind of management that the manufacturer found it increasingly difficult to get the raw materials for an increasing number of his products; some he had to seek at great distances, others gave out entirely and had to be brought in from foreign countries. All this naturally helped to increase the cost of wood products. In fact, it increased so rapidly that the people cried out greviously against the high prices, but they themselves were the owners of the trees they allowed to burn. They cried out against conditions created by their own negligence.

In the long run in this world men get what they pay for either in thought, effort or money. The forests of Ontario will continue to be destroyed by fire until the thought, care and money put into their protection is commensurate with the value of the property involved.

A Township to Plant Trees.

The Township Council of Keene, Ontario, has decided to take up the offer of the Ontario Government to supply trees and do the planting work on condition that the Township supplies the land. Under this enterprising scheme, the Province undertakes to supervise the plantation until maturity and then hand over the timber crop to the municipality.

The offer of the Ontario Government to assist the Township Councils in reestablishing timber crops on waste lands is being taken up with eagerness.

Improvements in Railway Fire Protection

By Wm. Kilby, Fire Inspector, C.N.R., Winnipeg.

A large part of the central western provinces, was in glacial times, a huge lake known as Lake Agazziz, and when the glaciers from the Hudson Bay region slowly forced the water out of the lake they left enormous flats of very valuable clay. The fertile prairie lands west of Winnipeg, world famous for their productiveness, were originally a lake bottom, and sometimes when excavations are being made the remains of shell fish are found and go to confirm this statement. In other parts where timber growth is in evidence the glaciers formed huge, saucer-like formations and on the edge of these is found the best timber, but the centre of the saucers, owing to the drainage being retarded by the rims or ridges is covered with a scrub growth of tamarac and black spruce. Along the outer edge of the rims, forest streams opening out into lakes were formed and early exploration was made by this method, consequently the explorers got their first information of the timber resources from the quantity they saw growing alongside the streams.

With this insufficient knowledge to go on, our wonderful timber supply was ruthlessly wasted, and efforts to conserve it by economical logging methods and protect it from devastating fires were considered an unnecessary expense.

The Use of Plowed Guards.

Many years ago, the Canadian Pacific railway reconizing the enormous damage done by prairie fires, established a system of plowing strips known as fireguards on either side of their track running through the prairie country. These strips stopped the fire from spreading over the prairie, but the root of the evil at that time, the locomotive, was not improved until years later, the policy being rather to stop the fire than to stop the cause. In forested regions the plowing of fireguards was not practicable and different measures, therefore, had to be adopted. Spark arresting and ash pan devices were experimented with, and the use of hard coal, which was obtainable in sufficient quantities a few years ago, were very successful, but with the development of the coal mines of Western Canada and the necessity of using this home product, the fire preventive devices on locomotives have not, so far, been developed to make the use of these light Western coals practicable.

In order to stop fires in forested country it was therefore necessary that other systems be adopted and special fire patrol, special vigilance by track forces and oil burning locomotives were put into use, but despite the combined efforts of Government Forestry Departments working jointly with the railways, each years sees the timber supply of Canada given a hard jolt by fires alongside the latter's lines.

Sometimes Falsely Blamed.

While it is frankly admitted that many fires are started from railway causes it is yet felt that the railways are held to blame for many fires of doubtful origin which they have not been guilty of starting.

The principle of immediate action is as applicable to forest and prairie fires as to the city ones, but owing to the enormous distance help is necessarily much longer in arriving. Communication is highly developed on the railway, and to use this to secure the best results is the first aim of the fire reporting system as used on the Canadian National Railway.

Early in 1914 a form (No. 1959) using telegraphic symbols was introduced, this in order to reduce the Telegraph Operator's work, and to handle with the least possible delay reports of fires. The form calls for the notification of officials who will be able to take any action that may be necessary to combat the conflagration, either in the forest or on the prairies. Oftentimes, it is necessary in serious fires to tie up train movements

and to despatch every available man, water tank cars, and the crude fire fighting appliances which are in such general use for fighting forest and prairie fires. There is no audience to witness the moving out of the fire fighters and their apparatus, but the issues at stake, sometimes involving human life, are almost as great as in the city where every modern appliance which can be devised is put into service.

Telegraph Report (No. 1959) is sent in every case to the District Roadmaster, the official with a first hand knowledge of the territory and of any available help; simultaneously, his Superintendent, General Superintendent, General Claim Agent, Assistant General Manager and the General Manager are advised, making the chain complete. Needless to say, where the Roadmaster can handle the situation he does so, and only in cases of extreme urgency is it necessary that he call for help from the higher officials. He is well acquainted with the Government forest and prairie fire fighting agencies and by previous co-operative arrangements these bodies work hand-in-hand to combat the fire menace.



A Forced Landing.

It took place on the fourth trip back to Remi Lake, Ont. The plane was carrying Capt. Maxwell, George Doan, mechanic; H. M. Blake and myself, passengers. When about an hour from Moose, too-thin oil flooded the engine making it impossible to "carry on." Capt. Maxwell fought the engine and coaxed it but found it conquering him. He circled a stretch of the Mattagami half a dozen times, with the altimeter dropping, marking every shoal and stone, before coming down. He made a beautiful landing in a spot where there was about five feet of water, between high, twisting, rock-bound banks. After a bitterly cold night on the shore of the Mattagami, with little to eat, we "took off" the next afternoon—an operation calling for the most delicate handling as there was not only the imminent possibility of smashing in the bow on a hidden rock but there was the necessity even after leaving the water of guiding the big plane between the twisting river banks until it had attained sufficient height to clear them and the bush. But it was done. And when we attained flying height visibility was wiped out by the smoke from forest fires and

He that planteth a tree is a servant of God,
He provideth a kindness for many generations,
And faces that he hath not seen shall bless him. —Henry Van Dyke.

heat haze that lay on the forest. Capt. Maxwell, in spite of a still misbehaving engine, had to give up the water and steer a compass course. We came down in the lake where the gasoline had been cached, added 15 gallons to the 5 left in our tanks, and in the late afternoon started on our last leg of 30 miles to Remi Lake. The visibility was worse than ever.

Maxwell was still steering by compass but an east wind sprang up and blew us miles out of our course. He climbed down to take observations and found we were below Kapuskasing, 14 miles from Remi Lake, so he headed along the railroad tracks and got home safely with the gasoline tanks all registering zero! Narrow enough!"—From Aeroplane and Motor Age.

Quebec Sends Four Foresters to Europe

The appreciation of the Quebec Government of the necessity for the practice of forestry on its non-agricultural lands, and of the need for thoroughly trained foresters to make its programme effective, has recently been further evidenced. Four of the employees of the Provincial Forest Service, Messrs. Guay, Landry, Baillairgé and Lussier—graduates of the Forest School at Laval University—have recently been sent to Europe by the Provincial Government, to spend a period of six months in making advanced studies of forestry practise and forest utilization in France, Belgium, Switzerland and Germany. One of the men will extend his studies to cover a period in Sweden. Among the lines of investigation to which particular attention will be paid by these men will be methods of lumbering, saw-milling, silvicultural practice, reforestation, aerial photography, forest research, wood technology and wood utilization, including the development of markets for hardwood species through small wood-using industries.

Europe and Canada.

While forestry conditions in Europe are widely different from those in Canada, the general principles of the science of forestry are the same the world over, though it is of course necessary to adapt the practice to local conditions in every case. In Europe, the practice of intensive methods of forestry—the systematic growing of wood crops—has been a matter of development through centuries, and foresters from other countries can learn much of direct value to them in a study of methods and conditions there.

A period of study in the forests of Continental Europe is, for example, a regular part of the curriculum of English and Scottish forest schools which prepare men for the practice of forestry in the United Kingdom, India, and other parts of the British Empire. The desirability of such study was particularly emphasized at the Imperial Forestry Conference, held last summer in London.

Quebec is setting the pace in this direction, with the prospect that a number of scholarships may be established, under which several Quebec foresters will be sent annually to Europe for intensive study of particular problems. The value of such a programme in developing and broadening out men for wider and more useful fields of activity at home is self-evident. The four men sent this year to Europe by the Quebec Government will, upon their return, take positions of responsibility in the Forest School at Laval and in the Quebec Forest Service, thus at the same time strengthening the courses of forestry instruction and increasing the effectiveness of the Provincial Forest Service in solving its problem of how best to retain the great areas of non-agricultural Crown timber lands of the Province in a condition to produce successive crops of the more valuable timber species. To accomplish this within the limitations of practice set by the surrounding economic conditions will tax the best efforts of a large staff of the most thoroughly trained and experienced foresters, for a period of many years.

The example set by Quebec in this direction may well serve as an object lesson to other Government agencies, Dominion and provincial, which are engaged in the administration of Crown timber lands.

Mechanical Attack on Fire

By M. A. Grainger, Lately Chief Forester of British Columbia.

A man was showing me over one of the pulp and paper plants back east last summer. He said: "These giant turbines in our power plant, the complex paper-making machinery in our mill, show what marvelously efficient thinking has been done to improve manufacture. And our products are marketed by the most up-to-date salesmanship on this continent. But in the woods, on which this large investment depends absolutely no thinking whatever has been done. The same old woods foreman is cutting timber in the same old way that he did 50 years ago; the hardwoods are killing out spruce reproduction; and 50 years hence, both mill and investment will be doomed unless we go into the woods and do that thinking now."

There is a similar lack of balance which we are trying to remedy in forest fire work. Motor patrols, wireless telephony, publicity, have all been brought into use, to detect and prevent fires; but the actual attack on a forest fire has kept on being mostly a pick-and-shovel, gunnysack-beating affair. Feeling that these useful articles are not the last work of modern fire fighting science, the Forest Service has been testing portable gas driven pumps. We have over 40 now in use, and the results have been most satisfactory. They do not replace picks and shovels, but supplement them much as a machine gun gives powerful support to rifle fire. Where water is available, one pump does the work of 20 men and far more efficiently. Near Cranbrook a single pump was largely responsible for keeping fire out of a valley containing 200 million feet of timber. Up this coast, the inhabitants of a little sawmill settlement had given up fire fighting one day last summer, and were watching the approaching fire in despair, when one of our launches arrived. The ranger and a pump came into action, and in a very striking manner the whole settlement was saved. Wherever a logging operator sees the work these pumps can do, he says he will get one for himself at once, and I hope he does not forget next day.

The pumps are gasoline-driven; weight 170 pounds; throw 45 gallons a minute, with a 180-foot head and cost about $800, with 1,000 feet of hose, complete. By using a relay tank, a couple can be used on a working radius of 2,000 feet.

Attack by Air.

For co-operative work with the various government services, the Canadian air board has just equipped a seaplane station near Vancouver, with hangar,, slipways, Machine shop. Two types of machine are provided for—the big, heavy twin-engine flying boat that can carry 14 persons, including the crew of three, or the same weight of fire pumps and equipment; and the medium size seaplane carrying one pilot and four passengers. For the present, we do not figure on patroling in the air to detect fires; the main idea is to provide a taxi service, with machines ready to take the air in any fire emergency.

St. Thomas and Its Trees.

The Hydro-Electric Commission and the Parks Department of the City of St. Thomas have placed the trimming of the trees on the streets where hydro wires are strung under the superintendency of the Horticultural Society. The St. Thomas Horticultural Society have as their chief plantsman, Mr. R. V. Smith, formerly superintendent of Parks of London, who is an expert along this line. The trimming is being done in a sane manner. That part of the work on the tree that it is necessary to remove to protect the wires is paid for by the Hydro Commission, and the balance of the work to make the tree symmetrical is paid for by the City Council. The spirit exhibited by these two municipal bodies is commendable.

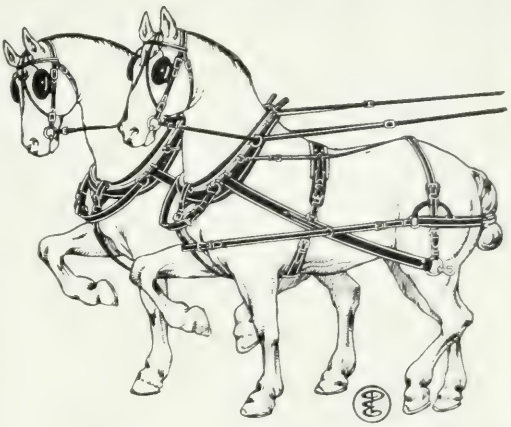
Harness That Stands The Heaviest Strains

People who are particular about the kind of horses they drive should also be particular about the kind of harness they use. Furthermore—the best way to get the utmost out of your horses—is to furnish them with the best possible equipment. Our "Carson Quality" Michigan Lumber and Skidding Harness is the best possible equipment that money can buy.

It is made of superior quality oak tanned leather—by skilled Canadian workmen. Built to stand the heaviest strains—it always "delivers" the goods.

We are operating one of the most complete and up-to-date harness factories in Canada—giving unexcelled service in supplying, sorting up orders for all harness parts, hardware, etc. Let us know your wants.

Ask us to send you full information.



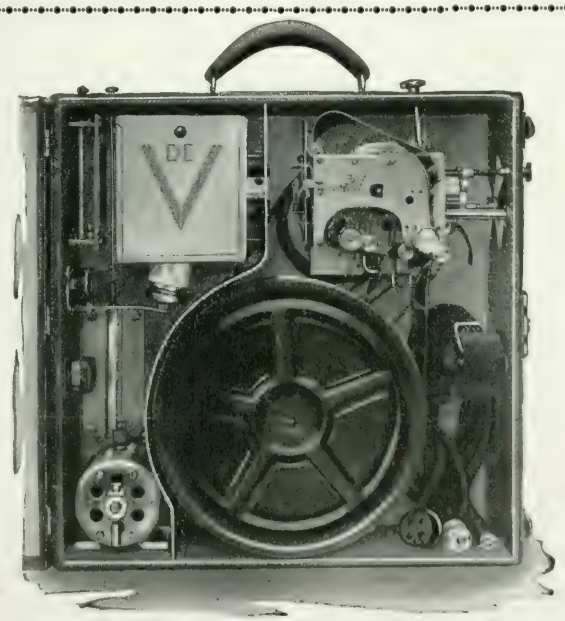
Michigan Skidding and Lumber Harness.

Carson Quality

Hugh Carson Co LIMITED

72 ALBERT ST., OTTAWA, CANADA.

We are now manufacturing a special line of pack sacks at particularly low prices. Ask us about them.



20 lbs—accommodates standard Film reels of 1,000 feet.

De VRY

SUIT CASE PROJECTOR.

A poor machine kills the value of a good film.

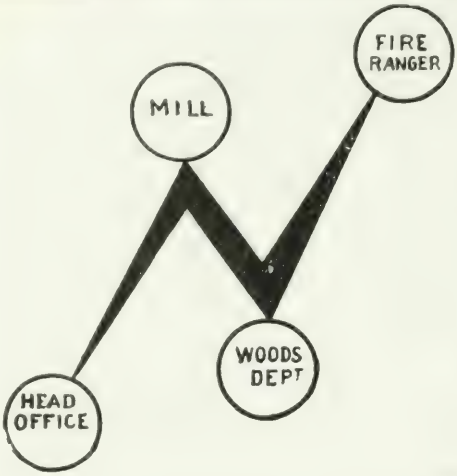
Space prevents our telling you about the many features which make the DeVRY SUPERIOR

Write for Booklet and Complete Description.

THE PERKINS ELECTRIC CO.

Executive Office:

TORONTO MONTREAL WINNIPEG



Communication

What is it worth to you?

Prompt—"On the Dot" Communication—that keeps your Mill and Woods Department in touch with your office in all weathers.

Uninterrupted communication between your Fire Rangers or Aeroplane Patrols.

MARCONI WIRELESS

Telegraphs
and
Telephones

MANUFACTURED, INSTALLED AND OPERATED BY

The Marconi Wireless Telegraph Company of Canada, Limited

Vancouver
Winnipeg
Toronto

11 St. Sacrament St.
MONTREAL

Halifax
St. John's
Nfl'd

Laurentide Company

LIMITED

GRAND MERE, QUEBEC

MANUFACTURERS OF

Groundwood Pulp — Newsprint Paper

Sulphite Pulp — Cardboard

To Replace Source of Fuel.

The Galt, Ontario, Reporter says in a recent issue:

As a county close on the heels of York, in production and wealth, Waterloo should lose no time in getting into communication with the Provincial Government. Bare hills and river banks by the score call for the tree planter, and with so favorable an opportunity presented, the advocates of Reforestation will be serving an important field by getting into touch with Queen's Park. What York can afford to do to perpetuate its forest wealth, Waterloo county can also do. Hundreds of acres of local wood lots are being denuded to serve the fuel user, while nothing is being done to make good the loss of the timber removed. From a sensible, far-seeing people more is expected to send down to posterity such forest growth as is called for to hold the strength of our soil and create future sources of supply.

Lumbermen and Pulp Manufacturers Attention!!

WE HAVE UNEXCELLED FACILITIES FOR HANDLING LARGE LINES OF INSURANCE ON LUMBER AND PULPWOOD

ALSO PULP AND PAPER MANUFACTURING PLANTS

The E. A. WHITEHEAD CO. LIMITED

INSURANCE BROKERS

509 LEWIS BUILDING
MONTREAL

The Belgo Canadian Pulp and Paper Co., Limited

Shawinigan Falls, Que.

- NEWS PRINT -

Groundwood Pulp
Sulphite Pulp
Lumber

Railways - Canadian National
Canadian Pacific

H. Biermans, Gen. Mgr.

To Pull 'Round Turns in Pathless Woods

Ability to take sharp turns in winding roads makes the Monarch Tractor particularly suited to the requirements of lumbering. The Monarch turns in its own length.

It lays its own track as it goes —broad manganese steel chain traction belts—that gives it firm footing on any surface.

In deep sand, over bogs, on snow and ice, its weight is distributed as though borne on a platform.

And these broad treads grip the ground over an immense surface.

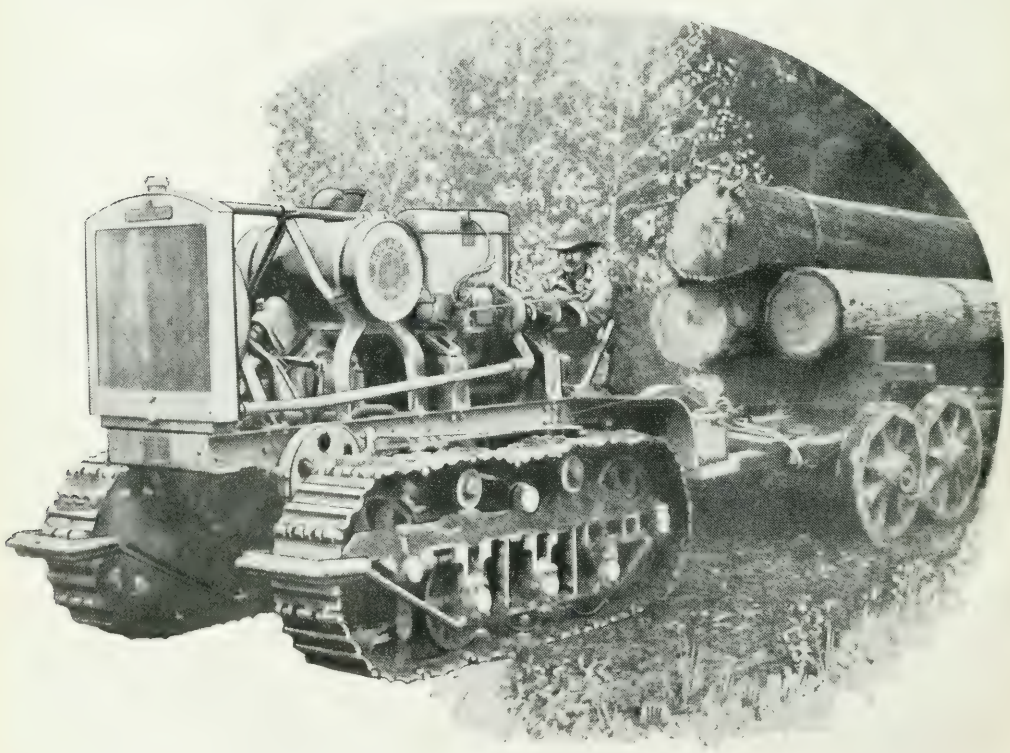
The Monarch is economical to operate, for its fuel is coal oil, but gasoline may be used if desired.

A winch used to replace the regular power belt pulley enables the Monarch to be equipped as a travelling power crane, which in loading and other similar work effects numerous savings in operating costs.

Write for Catalogue to Dept. F.J.I.

Monarch Tractors Ltd.

BRANTFORD, ONTARIO.



Trees Along New Highways.

The Ontario Department of Public Works has struck a popular note in preparing a tree planting programme to accompany the construction of highways. The Honourable Mr. Biggs, Minister of Public Works, states that like all the main roads in France, Ontario's highways will have considerable space on both sides, and will be lined with trees 75 feet apart, mostly maples and oaks. As outlined by the Department: "At frequent intervals, and guided by the opportunities of the district, parks and picnic groves for passing motorists will be established. The aim of the urbanites is to get out of the busy streets into the country. Shaded woods and sunny lake shores will be ideal spots for these nature seekers."

J

The JOST COMPANY, LTD
Bought — PULPWOOD — Sold
285 Beaver Hall Hill,
MONTREAL.
QUOTATIONS ON REQUEST.

100 Yards of Ditch in Three Hours

—a better, cleaner and more satisfactory ditch than one dug with pick and shovel, and made in less time and with less labor and less money.

C. X. L. Stumping Powder

dug this ditch—it is digging ditches for hundreds of farmers, who have found the value of C. X. L. on the farm. Whether you want to drain or irrigate—whether your field is upland or swamp—the C. X. L. way is the most practical.

Use C. X. L. for stumping clearing your waste land and planting your fruit trees—it does the work easier, more economically and it helps to produce better and larger crops.

Our book "Farming with Dynamite" tells you how you can use C. X. L. profitably on your farm. Write for your free copy today.

Canadian Explosives Limited
Transportation Building
Montreal

There is money in Agricultural Blasting. Write for proposition.
16



RU-BER-OID ROOFING



Is the peer of any composition roofing made.

It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

THE STANDARD PAINT COMPANY OF CANADA, LTD.

52 Victoria Square : : : : MONTREAL, QUE.

How the Prairie Gains by Trees

In speaking of the value of trees to prairie communities, says an interview in the Calgary Herald with Archibald Mitchell, western lecturer of the Canadian Forestry Association. Mr. Mitchell said that there were two ways in which water loss occurs on the prairies, which are by drying out and being blown away by the wind. When nature grows a block of trees, he said, she speedily shuts out the sun through the foliage of the trees and at the same time keeps the drying wind out by planting the trees close together. This principle must be followed to a large extent on prairie farms, he declared. The whole thing was a matter of moisture and the thing to be kept in view was that tree culture and grain growing are the same. In grain growing the farmer can check this water loss by summer fallow. Summer fallow in the forest was out of the question of course, and therefore the shade of the trees were used to produce the same results.

The tree problem was the same everywhere, he declared. The forester does not pay so much attention to the trees as he does to what is going on down below, and what one sees above ground is a mere indication of what is going on beneath it.

Lightning's Share of Blame.

"Let it be understood, there is no excuse for forest fires started by human agency. .No man has a right to start one and allow it to escape. If there was any danger in starting it, he had no right to take the chance, and if he did take it he should be ferreted out and take the consequences. Rarely, but very rarely, a forest fire originates from lightning, and such an one is the only kind of fire for which there is no one to punish. In an experience of fifty years I have seen but two forest fires that I could charge to lightning."—*Dr. Rothrock.*

HYDRAULIC TURBINES

(I. P. MORRIS DESIGN)

HIGH SPEED

PUMPS

PAPERMILL MACHINERY

ENGINEERS AND MANUFACTURERS OF HIGH SPEED NEWS MACHINES

Dominion Engineering Works, Limited

Cable Address:
"Domworks Montreal."

MONTREAL, QUE.

THE UNIVERSITY OF TORONTO

(The Provincial University of Ontario)

With its federated and affiliated colleges, its various faculties, and its special departments, offers courses or grants degrees in

ARTS—Leading to the degree of B.A., M.A., and Ph.D.
COMMERCE Bachelor of Commerce.
APPLIED SCIENCE AND ENGINEERING
B.A.Sc., M.A.Sc., C.E., M.E., E.E. Chem.E.
MEDICINE M.B., B.Sc. (Med.) and M.D.
EDUCATION " Paed. and D. Paed.
FORESTRY B.Sc.F. and F.E.
MUSIC " Bac. and Mus. Doc.
HOUSEHOLD SCIENCE AND SOCIAL SERVICE.
LAW LL.B., LL.M., and LL.D. (Hon.)
DENTISTRY D.D.S.
AGRICULTURE B.S.A.
VETERINARY SCIENCE B.V.S. and D.V.S
PHARMACY Phm.B.

TEACHERS' CLASSES, CORRESPONDENCE WORK, and SUMMER SESSIONS are arranged for the special benefit of teachers in service. Evening Tutoral Classes and Study Groups (for those in Toronto who wish to take advantage of them), Single Lectures and Courses of Lectures (for outside cities and towns) are also arranged, so far as possible. (For information regarding these write the Director, University Extension).

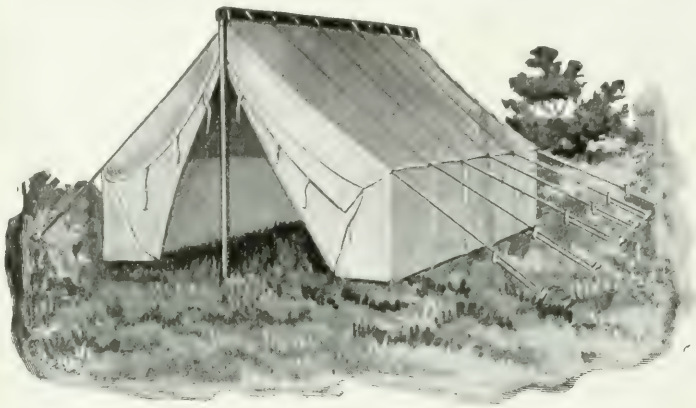
For general information and copies of calendars write the Registrar, University of Toronto, or the Secretaries of the Colleges or Faculties.

FEATHERWEIGHT SAIL SILK TENTS

Pre-war quality in Stock for this Season's Trade.

Waterproof—Insect proof. **Light—Strong—Compact.**

Two Colors—White; Green.



WOODS
Manufacturing Co., Limited.

Canada's Largest Producers of Outdoor Equipment.

OTTAWA CANADA

Dept. D.

Simcoe Takes Hold.

(By Ahmik in Toronto Globe.)

A country municipal forest covering 800 acres and within easy access by rail and motor.

That is what the County Council of Simcoe has provided for by the purchase of a block of waste land in the township of Vespra.

The location is between Midhurst and Anten Mills, within a mile of Hendrie station on the Penetang line of the old Grand Trunk and within easy reach of the leading highway connecting Barrie and Elmvale and within eight miles of the former town.

The land, wholly useless for ordinary agricultural purposes, was secured at a cost of $5.74 per acre. There is some second growth pine, white birch, red oak and a little hardwood on the property. The whole block was once covered mainly with pine and since this was removed the land has remained practically idle.

Province to do Planting.

The expectation is that the Province will provide seedlings and undertake the work of planting. The question of care after planting is still to be settled, but in view of the public spirit shown by the country in purchasing the property the Province would be fully justified in building a home and providing a caretaker for the protection of the trees during at least the early stages of growth.

Private Planting to Follow.

It is probable that the public enterprise already under way will be supplemented by private enterprise. County Treasurer Quinlan, who has been one of the chief movers in Simcoe county scheme, is already contemplating planting 25 acres of very stony land on property belonging to him near Lake Simcoe.

The work of reforesting the waste lands of old Ontario appears to be at last definitely under way.

Fire, An Evil Master.

The Provincial Forester of New Brunswick, Mr. G. H. Prince, in his report on forest fires during 1919, makes special reference to the losses caused by settlers' clearing fires and camp fires. In 36 cases, action was taken against parties for violation of the fire laws. The officials of the Forest Branch made it clear to the

ATTENTION ! **Fire Equipment, Limited,** is a manufacturing concern, not jobbers.

We have all kinds of **fire fighting appliances for bush fires,** such as pumps, hose, nozzles, etc.

Investigate our goods and prices and be convinced that we offer the best
Send for samples and catalogues.

FIRE EQUIPMENT LIMITED
244 Notre Dame Street West : : : Montreal.

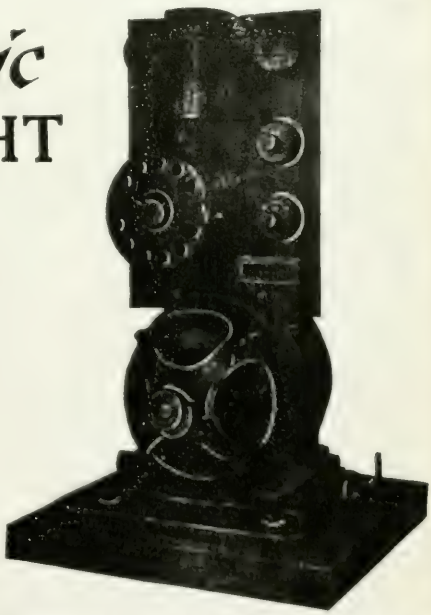
offenders that they did not wish to deal harshly with them but that the fire laws must be observed, in the interests of themselves, their neighbors and the timber owners. The presiding justice severely reprimanded the offenders, pointing out the danger of neglecting slash fires, in which many of the delinquents had lost their homes. None of the defendants pleaded ignorance of the slash-burning law, but each claimed *he did not expect his little fire to spread so rapidly.* The losses due to these small beginnings exceeded $100,000.

Northern Electric
POWER and LIGHT

¶ This Belt-connected Plant makes the installation of electricity in the smallest mills, practicable and economical. The unit can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

¶ Complete stocks of 32 volt belt-driven or direct-connected plants, appliances and standard wiring material always on hand at our Houses.



Northern Electric S-8 Belt-driven, 32 volt Electric Plant

Northern Electric Company
LIMITED

Montreal Quebec Toronto Winnipeg Calgary Vancouver
Halifax Ottawa London Regina Edmonton

MILL SUPPLY DEPARTMENT
BEVERIDGE PAPER COMPANY, LIMITED
MONTREAL
Agents from Coast to Coast
Everything in Paper Stocked in Montreal
Plastic and Liquid Roofings — Concrete Hardeners
Wood Preservative and Stains
PLIBRICO JOINTLESS FIREBRICK
Replaces Firebrick and Fireclay for all purposes, without skilled help for Steam Boilers, Woodburners, Dutch Ovens.

Paper and Lumber Manufacturers!
IF YOU WANT EXTRA QUALITY
MILL BROOMS
SEND YOUR ORDERS TO
THE PARKER BROOM COMPANY - OTTAWA

TIMBER LIMITS



We have a complete up-to-date survey of all available properties in the Provinces of Quebec, New Brunswick, Nova Scotia and British Columbia. Before investing in timber limits consult us. Reliable surveys and estimates procured. We have in hand practical lumber and pulpwood limits.

CANADIAN WOODLANDS AND PULPWOOD AGENCY, RGD.

600, McGill Building, MONTREAL, CANADA.

Cables: "Gefport, Montreal." Telephone: Main 3281.

Scottish Peer Loses by Fire.

Lord Glentanar, of Glen Tanar, Aberdeenshire, Scotland, was recently in Canada. He owns a large forest property and has the misfortune to have had the only disastrous forest fire in Scotland for nearly one hundred years. Twelve hundred acres of forest were burnt. The fire was probably caused by carelessness and burnt for a long time, owing to the character of the soil. Before returning to Scotland, Lord Glentanar purchased a gasoline forest fire pump and hose for use in case of emergencies.

Planting in Scotland.

Professor Leslie, of Aberdeen University, Scotland, has been studying forestry conditions i n Canada, and gives the following account of the planting activities of the British Forestry Commission along nursery lines in that section. In the Craibstone, about five miles from Aberdeen, in 1918, 800,000 seedings were grown and planted out in areas acquired by the Commission. In 1919, 2,000,000 seedlings were lifted and transplanted. Last spring, 2,000,000 seedlings were transplanted. These were mostly Scots Pine, larch and Sitka spruce. In the spring of 1919, extensive sowings were made in the Improvement Park and in the Woodlands Fields nurseries. Woodlands Field now has 1,300,000 spruce and 1,000,000 larch two year seedlings and the Improvement Park 5,000,000 larch, 4,800,000 Scots pine, 1,000,000 Japanese larch, 1,500,000 Sitka spruce, 100,000 American white spruce, 1,500,000 Douglas fir and 10,000 Austrian pine. Double the above quantities were sowed this spring.

The Laurentide Company, Ltd., is cutting one thousand cords of hardwood to be used in the manufacture of ground wood pulp. The species being cut are poplar, white birch, yellow birch and maple. The two first will be floated and the two latter will be transported in barges.

Timber Lands Bought and Sold
Timber and Pulp Wood Estimates
R. R. BRADLEY
CONSULTING FORESTER
4 Hospital St., MONTREAL, P.Q

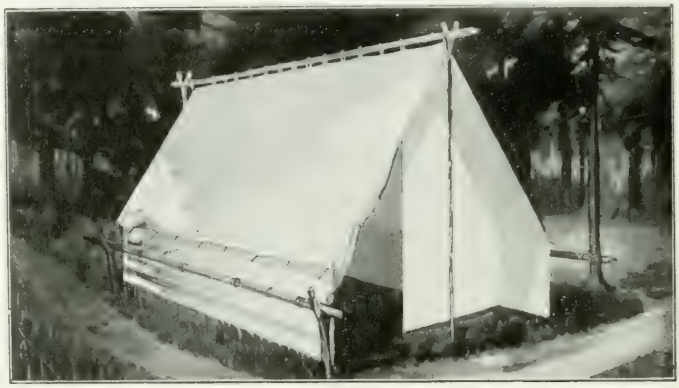
B. M. McGRATH
Colonial and Industrial Investments
Timber, Pulp Wood Areas and Waterpowers
Newfoundland and Labrador Mines and Minerals
Reports, Plans and Estimates Furnished
TRADE REVIEW BUILDING
ST. JOHN'S, NEWFOUNDLAND

GAGNON & MORISSETTE
TIMBERLAND CRUISERS
LUMBER CONTRACTORS
FOREST INDUSTRIES
CHICOUTIMI - - P.Q.

Timber Estimates
JAMES W. SEWALL Old Town, Maine.

GRANT-HOLDEN-GRAHAM
LIMITED

147 Albert Street,
OTTAWA, ONT.



Manufacturers of Tents of all descriptions.
Lumbermens' Clothing, Blankets, Etc., Etc.

Riordon Sales Company, Limited

MONTREAL

Largest sellers of Bleached Sulphite Fibre in the Country

Very Easy Bleaching Sulphite

Spruce, Pine and Hemlock Lumber

Sulphite Screenings

T. J. Stevenson **Geo. E. Challes,**

Sales Managers.

Air Photography in B.C.

(Victoria Times.)

Increased activity is noted from the Jericho Beach B. C. Air Station. The HS21, flying boat, which has made several trips to Victoria is now at Kamloops Lake, in charge of Major C. MacLaurin, superintendent of the B. C. Air Station, who with a party is now engaged in taking aerial photographs of forest limits in that neighborhood, for the Provincial Forestry Department.

The huge flying boat was dismantled and shipped by train to Kamloops, where it was taken to the lake and re-assembled. It has been engaged on the forest reconnaissance since Monday last, and it is learned that excellent results are being produced. Major MacLaurin is accompanied by two riggers, and one engine fitter, all from the British Columbia Air Service. Major Basil Hobbs is in command of the British Columbia Air Station in the absence of the superintendent.

It was learned to-day that there was some likelihood of a sub-station being formed at Kamloops to work in conjunction with the coastal air station.

Trees.

I think that I shall never see
A poem lovely as a tree.
A tree whose hungry mouth is pressed
Against the earth's sweet flowing breast;
A tree that looks at God all day
And lifts her leafy arms to pray;
A tree that may in summer wear
A nest of Robins in her hair;
Upon whose bosom snow has lain;
Who intimately lives with rain.
Poems are made by fools like me,
But only God can make a tree.

JOYCE KILMER.
(Killed in France.)

Mr. Caverhill Promoted.

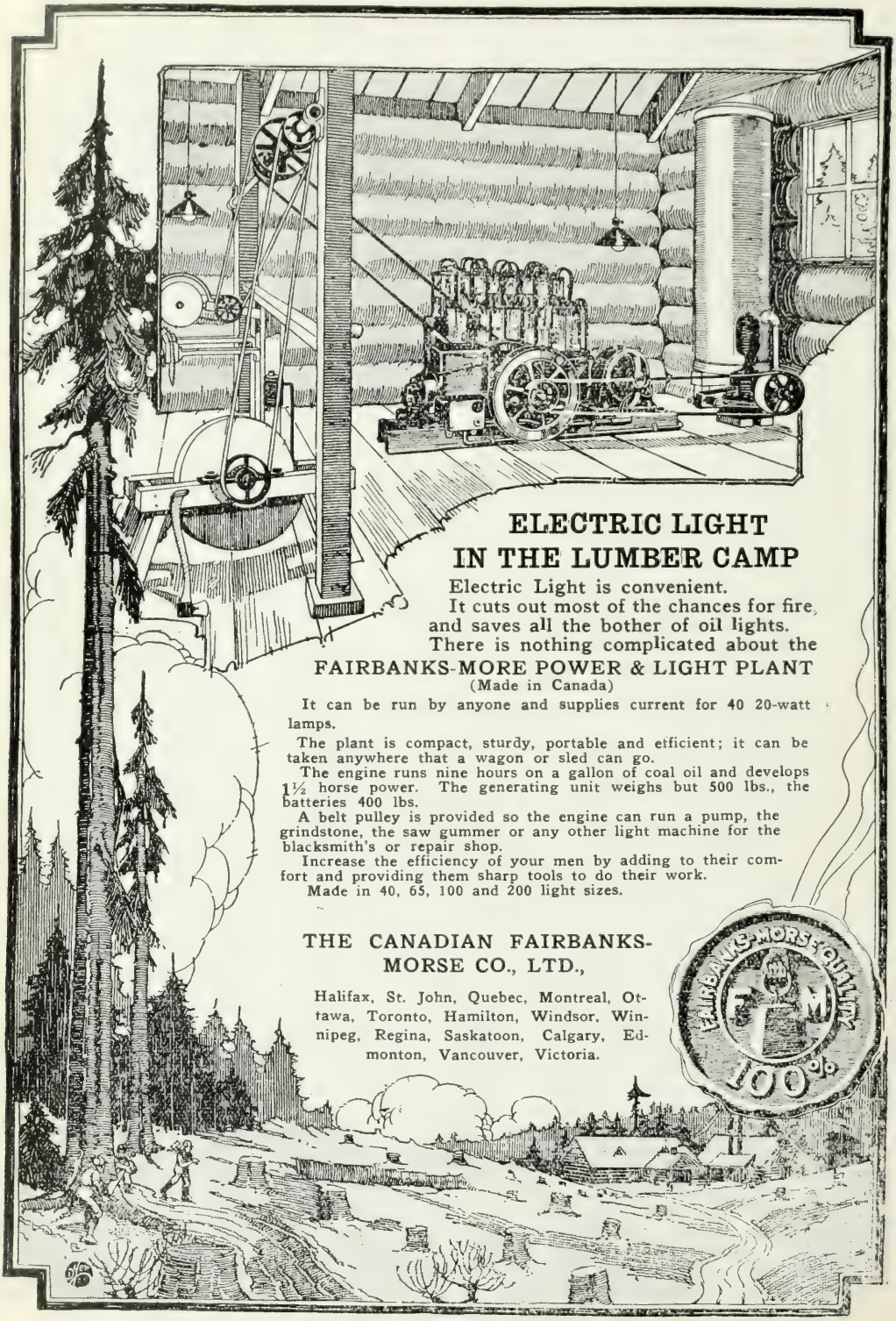
Mr. P. J. Caverhill, formerly chief forester of New Brunswick and more recently with the B. C. Forest Service has been appointed chief forester of British Columbia in succession to Mr. M. A. Grainger, who resigned.

BROMPTON PULP and PAPER COMPANY, Limited

EAST ANGUS, QUEBEC

MANUFACTURERS OF
NEWS PRINT PAPER
KRAFT PAPER
FIBRE PAPER
MANILLA PAPER
BOX BOARD
SULPHATE PULP
GROUNDWOOD PULP
and

LUMBER OF ALL KINDS



ELECTRIC LIGHT IN THE LUMBER CAMP

Electric Light is convenient.
It cuts out most of the chances for fire, and saves all the bother of oil lights.
There is nothing complicated about the

FAIRBANKS-MORE POWER & LIGHT PLANT
(Made in Canada)

It can be run by anyone and supplies current for 40 20-watt lamps.

The plant is compact, sturdy, portable and efficient; it can be taken anywhere that a wagon or sled can go.

The engine runs nine hours on a gallon of coal oil and develops 1½ horse power. The generating unit weighs but 500 lbs., the batteries 400 lbs.

A belt pulley is provided so the engine can run a pump, the grindstone, the saw gummer or any other light machine for the blacksmith's or repair shop.

Increase the efficiency of your men by adding to their comfort and providing them sharp tools to do their work.

Made in 40, 65, 100 and 200 light sizes.

THE CANADIAN FAIRBANKS-MORSE CO., LTD.,

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver, Victoria.

Women as Fire Fighters.

Albuquerque, N. M., women helped in the hazardous game of fire-fighting during the past season in the Southwest, according to the forest officers of several of the Arizona and New Mexico Forests. Some were stationed on the lookout towers of lonely high peaks, others working remote forest telephone exchanges through many hours when the danger was acute, and others on the very fire line itself, leading or fighting the fires with the hastily assembled crews. Forest fire fighting has generally been conceded a full sized man's job, but the long annals of the Forest Service throughout the West are filled with stories of women taking a helping hand at the various phases of the game. This past season in the Southwest was no exception.

On the Rincon Mountains, a part of the Coronado Forest in Southern Arizona, the high Spud Rock Lookout was "manned" during the fire season by Mrs. Lyle B. Smith, wife of the local Forest Ranger. Mrs. Smith, in addition to her lookout duties, cleaned and brushed out a number of miles of trail in the vicinity of her tower. She had occasion late one night during the season to make a search of ten miles, with a fire guard and tools, across the mountains for a reported fire.

The West Benefits.

Referring to the Tree Planting Campaign of the Canadian Forestry Association in the Prairie Provinces last summer, the Calgary Herald states:

"The tour was so successful it will be repeated next year. This is real educational work and bound to be productive of lasting benefit to the West."

TREES, SHRUBS and SEEDS

HARDY NORTHERN TREE STOCK

EDYE-DE-HURST & SON, DENNYHURST
DRYDEN, ONT.
Shippers to H.M. Government.

Turning the Corner

The rapid nourishment and stimulation supplied by Bovril often help a patient over a critical period. Also when the corner is turned, Bovril is a powerful aid to convalescence.

BOVRIL

FIRE HOSE **FIRE EXTINGUISHERS**
FIRE DEPARTMENT SUPPLIES GENERAL RUBBER GOODS

LINEN HOSE FOR FOREST FIRE FIGHTING.

Having supplied a number of the Forest Protective Associations, we are thoroughly familiar with the specifications of their requirements for fighting forest fires, and carry in stock, and are prepared to furnish such equipment on short notice.

THE CANADIAN FIRE HOSE COMPANY, LTD.
30 St. Francois Xavier St. - - MONTREAL
REPRESENTATIVE FOR PROVINCE OF QUEBEC FOR AMERICAN-LAFRANCE FIRE ENGINE CO. OF CANADA, LTD.

FOREST FIRES TAKE AWAY JOBS!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY AND GET AFTER HIM.

Put Out Your Camp Fire;
Never Toss Away a Lighted Cigarette.

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by The

SPANISH RIVER PULP & PAPER MILLS, LTD.
Sault Ste. Marie, Canada.

Abitibi Power and Paper Company

LIMITED

Head Office - - - MONTREAL, Que.

Manufacturers of

NEWSPRINT PAPER
SULPHITE PULP
GROUNDWOOD PULP

Mills at IROQUOIS FALLS, ONT.

GREENSHIELDS & CO.

MEMBERS MONTREAL STOCK EXCHANGE
DEALERS IN CANADIAN BOND ISSUES

✣

We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.
Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.
We have assisted in the initial financing and distribution to investors of the **following securities which will be quoted on request:**

Brompton Pulp & Paper Co., Common (6%) Stock and General Mortgage 6% Bonds.

Howard Smith Paper Mills, 8% Pfd. and Participating Stock.

Riordon Pulp & Paper Co., Common (10%) Stock.

Mattagami Pulp & Paper Co., 7% Convertible Debentures.

Wayagamack Pulp & Paper Co., First Mortgage 6 Bonds and Common (4%) Stock.

GREENSHIELDS & COMPANY

17 St. John Street : : : : : : Montreal, Canada
TORONTO, ONT. OTTAWA, ONT.

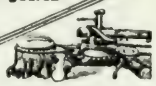
Forest fires drive out population.
There are no jobs in dead forests.
Canada has not one acre of timber to throw away.

EVERGREEN SEEDLINGS

We are equipped to grow EVERGREEN SEEDLINGS in million lots on contract, for REFORESTTING PROJECTS. All standard varieties grown by experts. We save you money. Write for information.

THE D. HILL NURSERY CO. Evergreen Specialists
Largest Growers in America.
Box 503. DUNDEE, Ill., U.S.A

Try This Stump Puller at Our Risk The Smith Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address
W. Smith Grubber Co.
11 Smith Sta
LaCrescent, Minn



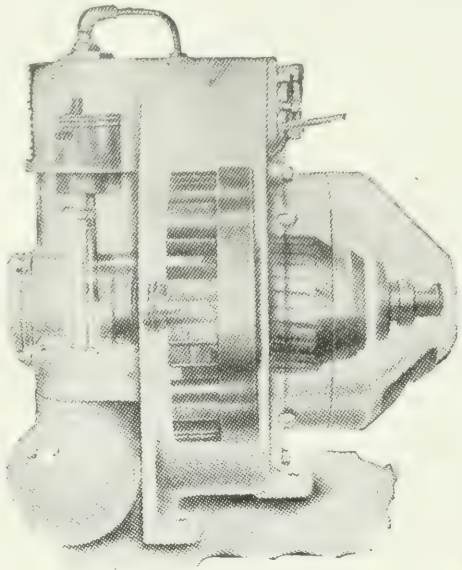
ASK FOR EDDY'S EVERYWHERE IN CANADA





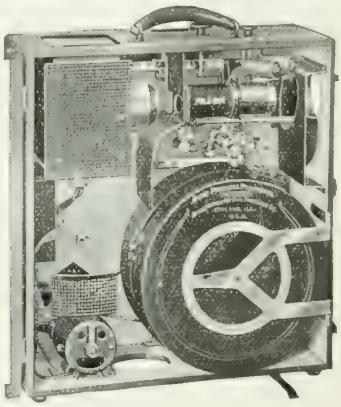
QUEEN'S UNIVERSITY
KINGSTON, ONTARIO

ARTS
Part of the Arts course may be covered by correspondence.
MEDICINE EDUCATION
APPLIED SCIENCE
Mining, Chemical, Civil, Mechanical and Electrical Engineering
SUMMER SCHOOL July and August. NAVIGATION SCHOOL December to April
26 GEO. Y. CHOWN, Registrar.



The Dynelectric Electric Light Plant

Weighing only 200 lbs., will give 900 watts of electricity. This equipment works with excellent results. for. motion picture projection.



The Acme Motion Picture Projector

Will project 10 x 12 foot picture. Equipped with fireproof safety magazine. Takes 1,000 foot reels of standard film. MOTOR DRIVEN—FAN COOLED

The above equipment is identical with that used on the tours of Canadian Forestry Association's Cars.

WRITE FOR DESCRIPTIVE CIRCULAR.

PHOTOGRAPHIC STORES

65 Sparks Street

OTTAWA ONT.

Fresh Beef *for* Camps

This is a product your men will want on the table. Feed them with the best. Buy Davies' product. We can also supply you with Frozen Beef. All we ask is a trial order.

Write, or wire to-day at our expense and we will gladly submit delivered prices.

Also Try

Long Clear Bacon	Peerless Shortening	Davies Mincemeat	Mess Pork

THE WILLIAM DAVIES COMPANY LIMITED.

MONTREAL. TORONTO. HAMILTON.

"He Blazed a Good Trail."

At the request of the staff on the Duck Mountain Forest reserve in Manitoba, "Windy Mountain," the highest hill on this reserve, has now been officially named "Ketchum Hill" in memory of James Carleton Ketchum, who was the only surviving son of T. Carleton L. Ketchum, Barrister, of Woodstock, N.B. The late Mr. Ketchum entered the University of New Brunswick after he was graduated from the Carleton County Grammar School, taking up a forestry course. In 1914 he received appointment to the staff of the Dominion Forestry Branch and was assigned to the Duck Mountain Reserve. He was later attached to the 23rd Howitzer Battery and on the 3rd day of May was fatally wounded in action near Vimy and was buried the next day in Aux Reitz Cemetery.

A brass plate to his memory has been placed on a large boulder on the top of the Manitoba hill with a suitable inscription and the words, "He blazed a good trail." Mr. Ketchum was particularly talented as an amateur artist, both in pencil and colors and has left some beautiful pieces of work, which will ever be treasured by his relatives and friends.

The Family Tree.

Norfolk, Va.—When Miss Ada Oakes, daughter of Mr. and Mrs. J. C. Oakes, of Washington, N.C., became the bride of Walter Pine, of Salisbury, N.C., recently, it proved to be an unusual marriage. The pair decided to have a "wooden wedding." Everybody that took a leading part in the ceremony had a name like a tree. For instance:

The groom, Walter Pine.
The bride, Miss Ada Oakes.
The best man, Robert L. Birch.
The bridesmaid, Anna Lee Laurel.
The parson, Rev. Oscar T. Wood.

The ceremony was performed at Washington, N.C., and to make the "wooden flavor" complete the couple went to Hickory, N.C., to spend a week with the bridegroom's aunt, Mrs. E. V. Shingle

Idle Forest Land.

The depletion of timber in the United States says "The North Woods" has not resulted primarily from the use of our forests but from their devastation. The kernal of the problem lies in the enormous areas of forest land which are not producing the timber crops that they should. There are 326 million acres of cut-over timberlands in the United States. Their condition ranges from complete devastation, through various stages of partial restocking or restocking with trees of inferior quality, and the whole woodland rapidly increases in value by the elimination of inferior trees.

With an active market for cordwood and for fence posts, poles and lumber there is every inducement to clear out the inferior trees—diseased, dying, crooked, and less valuable kinds. Right cutting also includes the removal of large, sound trees whose growth is slow, because they are nearing or have reached maturity. The cutting should be done only at a time of favorable market condition or when building or other timber is needed on the farm.

Ontario's Need For Cruises.

Officers of the Commission of Conservation, who have been engaged upon the work of making an inventory of the forest resources of Ontario, have been struck by the lack of reliable information regarding the timber conditions in certain regions which have been opened up by railways for some time and for which it might reasonably be expected that fairly accurate and complete data would be available. There is a notable absence of the results of systematic cruising which could very economically be carried out in conjunction with land surveys. Undoubtedly, progress in the work of cruising timber areas was very severely handicapped during the war by the difficulty of securing the necessary staff.

In view of the frequent inquiries from foreign investors for authentic information respecting the timber and pulpwood resources that are available for exploitation in Eastern Canada, it is essential that the work of making thorough timber cruises and of compiling authentic forest maps be given sufficient staff and funds to ensure immediate and rapid progress. There is little doubt concerning the availability and the eagerness of capital to engage in the development of forest industries the most urgent need is to make known the situation, character and quantity of the resources that are available for such exploitation. The Commission of Conservation is collecting and collating all of the authentic data that can be obtained in regard to Ontario, but the task is rendered doubly difficult by the fact that over many large and important areas satisfactory cruises have never been made.—*A. V. Gilbert.*

HIBBERSON BROS.
Forest Engineers and Surveyors
Cruising, Mapping, Logging Costs, Flumes Logging R.R.'s
Appraisal on Timber Holdings for Banking Interests a specialty.
Information on B.C. Timber supplied at low cost.
Fifteen years experience cruising British Columbia Timber.
Suite 701-5 Belmont House, Victoria, B.C.

LT.-COL. L. J. D. MARQUIS
Forest Engineer and Mem. Can. Soc. of F.E.; Quebec Assoc. of F.E.;
Former Mem. Que. F. Service
Timber Factors and Logging Costs
Facts on Forest Growth and Future Products
Forest Cruising and Mapping
GIFFARD - - - - - QUEBEC

Timber Estimating and Mapping
Management of Forest Properties
Supervision of Lumbering Operations
Forest Planting.
COOLIDGE & CARLISLE
FOREST ENGINEERS
BANGOR - - - - - MAINE

University of Toronto
Library

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET

Acme Library Card Pocket
Under Pat. "Ref. Index File"
Made by LIBRARY BUREAU

Author Canadian Forestry Journal
Title 16 - 1919